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WEED ABSTRACTS

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NOTES FOR READERS OF WEED ABSTRACTS

Weed Abstracts endeavours to provide a comprehensive coverage of the world's literature on weeds, weed control and closely allied subjects. To this end, over 370 journals and nearly 100 annual reports are regularly searched. Other journals, reports, bulletins, etc. are abstracted as they are seen. Additional coverage is obtained through agreements with other abstracting organisations.

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As far as possible journal abbreviations given in the World List of Scientific Periodicals are used. Holding libraries in Oxford and elsewhere are also taken from the World List, e.g. O.BO. = Botany Department, Oxford. Numbers at the end of abstracts, e.g. 75(492) are for internal use only.

When a paper is by more than one author, only the address of the first author is given.

Where an abstract is taken from an abstracting journal the acknowledgement follows the abstract, e.g. Herb.Abstr., 2,163. Where it is only quoted in part the acknowledgement is preceded by the word "from", e.g. From Biol.Abstr., 2,294.

The Information Section is always pleased to receive comments and suggestions for the improvement of Weed Abstracts.

* An asterisk before the author's name indicates that only the title of the paper has been seen.

Continued from the inside back cover.

ac	- acre(s)	in.	- inch(es)	p.s.i.	- pounds per square in.
a.e.	- acid equivalent	kg	- kilogram(s)	v/v	- volume/volume
a.i.	- acid ingredient	l	- litre(s)	w/v	- weight/volume
cm	- centimetre(s)	lb	- pound(s)	w/w	- weight/weight
d.b.h.	- diameter at breast height	m	- metre(s)	>	- greater than
		ml	- millilitre(s)	<	- less than
ft	- foot (feet)	oz	- ounce(s)	#	- pounds per acre
g	- gram(s)	post-em.	- post-emergence	±	- with or without
gal	- gallon(s)	pre-em.	- pre-emergence		
ha	- hectare(s)	p.p.m.	- parts per million		

Language abbreviations: an initial capital denotes the language of the article, a small letter that of the summary: - Dan. - Danish, Du. - Dutch, E. - English, F. - French, G. - German, It. - Italian, Jap. - Japanese, Nor. - Norwegian, Russ. - Russian, Span. - Spanish, Sw. - Swedish.

See also 1922, 1926, 1931, 1938, 1955, 1956, 1972, 1985, 2001, 2003, 2013, 2024, 2034, 2054, 2086, 2088.

1873. BADIE, O. Las malezas en la comercializacion de cereales y oleaginosos. [Weeds in the marketing of cereals and oil-bearing crops.] Rep.Est.exp.agropec. Pergamino, 1959, 23-8, (Span.).
A discussion of the problem in Argentina of weeds and grain seed purity, with some examples of average % of weed seeds in various crops in different regions and of the most prevalent individual weed seeds in various crops. - D.M.L.S. [G.R.I.]

1874. WURGLER, W. (Sta.federales d'Essais Agricoles, Lausanne, Switzerland). La destruction des mauvaises herbes dans les cultures. [Weed destruction in crops.] Rev.Rom.Agric., 1960, 16,(2),9-24, figs.5.
This review is a practical summary of information on weed control. It contains a list of groups of herbicides, with rules for their use in general, and more particularly in maize, cereals, root crops and grass; with details of use in vine-growing, forestry and market gardening. - P.C. [34(494)]

1875. CHURCHILL, B., ERDMANN, M. and GRIGSBY, B. Weed control in field crops. Ext.Folder Coop.Ext.Serv., Michigan State Univ., 1960, F-222, pp.12. [80(77.4)]

1876. PETERSEN, H.I. Kemisk ukrudtsbekaempelse - endnu engang. [Chemical weed control - yet again.] Dansk Landbr., 1959, 78,(5),149-52, figs.4,tabs.1.
Practical weed control in leys, cereals, peas, oil-seed flax, fibre flax and potatoes is reviewed briefly and a table gives information on the control of a number of important weeds in different crops in Denmark. - P.J.B. [101(489)]

1877. RADEMACHER, B. (Inst.Pflanzenschutz, Stuttgart-Hohenheim, Germany). Neuzeitliche Unkrautbekämpfung. [Modern weed control.] Wiss.Zeitschr.Karl Marx Univ., Leipzig, 1955/6, 5,251-6.
A general review of current knowledge of herbicides, with a description of the mode of action of the more important ones, and notes on their uses in crops. The importance of correct cultivations for the proper working of herbicides is stressed. - P.C. [86(43)]

1878. SCHMIDT, O. Herbstunkrautbekämpfung mit Raphatox. [Autumn weed control with Raphatox.] Mitt.dtsch.LandwGes., 1959, 74, (40),1166,1168, tabs.2.
Results of experiments conducted over an area of some 7000 ac emphasise the difficulty of controlling winter weed growth by spring applications of herbicide. Control in a wet spring is particularly poor. DNOC (Raphatox 4-6 kg/ha) + MCPA liquid 2 l/ha applied in December on winter barley gave adequate control, without harming the crop, of Lamium album, Stellaria media, Matricaria chamomilla, Veronica spp., Galium aparine, Fumaria officinalis, Geranium pratense, Myosotis sp., Viola tricolor, Centaurea cyanus, Capsella bursa-pastoris, Lysimachia nummularia.
Severe frost soon after winter applications, and all spring applications, may damage the crop. Late autumn, therefore, appears to be the optimum time for spraying. Large droplet sizes, booms set low and high volume (600-800 l/ha) gave best results with applications made after the dew was evaporated. High atmospheric humidity is desirable, with temperature not below 37°F. - P.C. [248(43)]

1879. CANADA, (Ontario Agric.Coll., Guelph, Ontario, Canada). Disease, insect and weed control (weed section). 84th Ann.Rep.Ont. agric.Coll., 1959, 35-6.
Current work on the persistence of simazine is described, and the possibility of its replacement by atrazine discussed. Experiments on sugar beet with EPTC, CDEA and endothal showed that incorporation in surface soil pre-planting gave best results; as was also the case with diuron and dalapon for potatoes and beans. - P.C. [O.W.]

1880. FRIESEN, G. and SHEBESKI, L.H. (Univ. Manitoba, Winnipeg, Manitoba, Canada). Economic losses caused by weed competition in Manitoba grain fields. I. Weed species, their relative abundance and their effect on crop yields. Canad.J.Plant Sci., 1960, 40,(3),457-67, tabs.7, bibl.20.
During 1956-8 studies were made of 142 fields, of at least 20 ac each, in which wheat, oats, barley or flax were to be sown. The fields were selected at 6 mile intervals on either side of main roads, within a 60-mile radius of Winnipeg. Immediately after sowing, 10 paired plots, each 4 ft square, were marked off in each field. One member of each pair of plots was kept weed-free by hand-weeding at

weekly intervals. Twenty-eight weed species were present, the major ones being Sinapis arvensis, Avena fatua, Setaria viridis and Polygonum convolvulus. Weed counts in the fields ranged from 0 to 2143 weeds/yd^2, with an average of 224 weeds/yd^2. Reduction in crop yields due to weed competition in individual fields ranged from nil (apparent) to 61.5%, the average reduction being 15.25%. This represents an average annual loss in Manitoba of 28 657 070 bushels of grain, valued at approximately $32 379 537.

In 28 fields, 2,4-D or MCPA were sprayed on half the plots. The average grain loss due to weed competition was 10.3% on sprayed plots, and 16.6% on unsprayed plots, and the average increase of almost 3 bushels/ac on sprayed plots more than compensated for the extra expense involved. - J.W.F. [0.RE.]

1881. UNITED STATES. Amiben progress report. Tech.Serv.Data Sheet Amchem Products Inc., 1960, E-160, pp.19.

The results of weed control trials with amiben in different States of the U.S.A. during 1959 are summarised. Crops showing good tolerance of amiben at rates suitable for effective weed control were: soybeans, cowpeas [Vigna sinensis], groundnuts, carrots, parsley, parsnip, flax, squash and pumpkin and tomato transplants. Conditional tolerance was shown by: brocooli, cabbage and pepper (transplant; granular application), lima beans (some varieties), potatoes (at lay-by) and snap beans (more susceptible than soyabeans). Given good moisture conditions, pre-em. weed control with amiben at 1 # was satisfactory. Where 0.5-1 in. of rain fell during the first 14 days after treatment, rates of 4 # were consistently effective. Weeds said to be controlled (conditions unspecified) included Amaranthus retroflexus, Chenopodium album, Stellaria media, Polygonum sp., Brassica nigra, Ambrosia artemisiifolia, Rumex crispus, Abutilon theophrasti, Barbarea vulgaris, Setaria spp., Echinochloa crus galli, Digitaria ischaemum, Agropyron repens, Sorghum halepense, Avena fatua and Lolium perenne. Tests showed a low level of animal toxicity for amiben. - P.J.B. [0.W.]

1882. FERTIG, S.N. 1960 weed control in field crops. Ext.Bull.N.Y.State Coll.Agric. (Cornell Univ.) Ext., 1960, 821, pp.6.

The recommendations are the same as those drawn up in 1958 (W.A., 7,1436) with the following additions: maize, simazine or atrazine at sowing 2 # in 30 gal water, or 3 to 5 days after planting at the same rate where annual grasses are a problem; for grass control in birdsfoot trefoil <6 in. high, dalapon applied in the spring at 3 # in 30 gal water; smartweed [Polygonum spp.] 2,4-DB 2 # applied early after emergence. - J.W.F. [127(74.7)]

1883. HAGOOD, E.S. (Niagara Chem.Div.,Food Machinery & Chem.Corp.,Middleport,New York State,U.S.A.) Evaluation of 2,6-dichlorobenzonitrile as a pre-planting soil-incorporated and a pre-emergence herbicide. Proc.Joint Meet.16th N.Cent. & 10th West.Canad.Weed Control Conf., 1959, 47-8.

Pre-sowing. None of the following tolerated 1 or 4 # of 2,6-dichlorobenzonitrile (2,6-DBN) when sown 1 or 3 weeks after treatment: peas, snapbeans, soybeans, wheat, oats, rice; groundnuts and maize showed partial tolerance of 1 # but not of 4 #; 0.25 # caused no injury, but gave no weed control. Groundnuts, wheat and maize were susceptible to 1 and 4 # when sown the day of treatment.

Pre-emergence. Counts 1 month after treatment indicated that 4 # 2,6-DBN applied 3 or 4 days after sowing was safe in snapbeans, soybeans, groundnuts, peas, potatoes, maize, barley, rice, wheat and sunflowers; cotton, sorghum and sugar beets were reduced, but 6-8 weeks later only sugar beets and sorghum showed injury.

Post-emergence. When 4 and 6 # 2,6-DBN was applied 23 days after sowing which was done on 25th June, observation 2 days after treatment showed no injury to groundnuts, peas, rice or maize, slight injury to sorghum and onions, and moderate injury to flax. 4 and 6 # killed 37% and 60% respectively of Avena fatua; the survivors showed injury. - D.M.L.S. [0.W.]

1884. HAYWARD, P.R. Weed-free winter beans. Fmrs' Weekly, 1960, 53,(19),90-1.

A note is given on the pre-em. use of simazine at 1.5-2 # in 20-100 gal water at 10-14 days after sowing winter beans. The results of trials in 1960 indicated that yields of winter beans on sprayed, non-hoed plots equalled that of sprayed and hoed and hoed-only plots. It is considered that simazine may enable row widths to be reduced to 8-10 in. apart with advantage. Complete control of Alopecurus myosuroides, Stellaria media, self-sown barley and most of the normal annual weeds, including wild oats, is claimed. - P.J.B. [0.W.]

1885. CORNS, W.G. (Dep. Plant Sci., Univ. Alberta, Canada). Comparative effects of Avadex, Carbyne, and fenac on seedlings of wild oats, wheat and barley. Proc. Joint Meet. 16th N. Cent. & 10th West. Canad. Weed Control Conf., 1959, 15-6, tabs. 2.

In greenhouse tests, Avadex and barban 0-8 #, and fenac 0-16 # were incorporated into the top inch in black loam soil immediately before sowing wild oats, Parkland barley and Thatcher wheat. Supplementary trials with gray-wooded and sandy soil were carried out using 1 # of each chemical. Barley was more sensitive than wheat to barban and more susceptible than wheat or wild oats to fenac. Barban caused more marked injury to wild oats and wheat in sandy soil than it did in black loam soil, the gray-wooded soil showing an intermediate effect. Avadex and fenac showed similar, but much less marked differences in response to soil type. - J.W.F. [O.W.]

1886. GULL, P.W., ZEISIG, H.C., EPPERLY, J.R., PULLEN, J.W., DUBROVIN, K.P. JONES, J.W. and ECK, J.A. (Spencer Chem. Co., Kansas City, Missouri, U.S.A.) Results of field trials with Carbyne (4-chloro-2-butynyl N-(3-chlorophenyl)carbamate) on the control of wild oats in wheat, barley and flax. Proc. Joint Meet. 16th N. Cent. & 10th West. Canad. Weed Control Conf., 1959, 51.

Includes the information that hollow-cone nozzles were about twice as effective as fan-type, with solid-cone nozzles intermediate, for application of barban. Spraying with barban 0.5-1 # resulted in yield increases of 5 to 6 bushels of wheat, 6 to 15 bushels of barley, and 2 to 6 bushels of flax/ac where wild oat infestation had been medium to heavy. - J.W.F. [O.W.]

1887. BUCHHOLTZ, K.P. (Univ. Wisconsin, Madison, Wisconsin, U.S.A.) The response of oats to applications of amitrole. Proc. Joint Meet. 16th N. Cent. & 10th West. Canad. Weed Control Conf., 1959, 48-9, tabs. 4.

Amitrole 2 and 4 # applied when oats were in the tillered stage gave good control. There was little effect on crop yield although, in some cases, 4 # caused damage, particularly to the variety Clintland 60. - J.W.F. [O.W.]

1888. SCHNEIDER, E.O. (Geigy Agric. Chem. Corp., Sawmill River Rd, Ardsley, N.Y. State, U.S.A.) Comparison of simazine and Atrazine for weed control in corn. Proc. Joint Meet. 16th N. Cent. & 10th West. Canad. Weed Control Conf., 1959, 52-3.

Maize is extremely tolerant to simazine and atrazine and both are recommended for pre-em. application. Simazine has little, if any, foliage contact value while atrazine is effective when applied post-em. against broad-leaf weeds and grasses; registration is pending for atrazine as a post-em. herbicide on maize to be applied when weeds are < 2 in. high. Simazine and atrazine show a varying degree of selectivity on certain weeds e.g. velvet leaf (Abutilon theophrasti) is more sensitive to atrazine than to simazine, whereas the latter will give better control of barnyard grass (Echinochloa crus galli), Panicum spp. and crabgrass (Digitaria spp.).

At 20-25°C, the solubility of simazine is about 5 p.p.m. whereas atrazine is about 70 p.p.m., therefore, during a dry season atrazine is more effective. - J.W.F. [O.W.]

1889. GODFREY, K.L. and HAMM, P.C. (Monsanto Chem. Co., Organic Chem. Div., Res. Dep., St. Louis, Missouri, U.S.A.) "Randox T" a new chemical weed control mixture for corn. Proc. Joint Meet. 16th N. Cent. & 10th West. Canad. Weed Control Conf., 1959, 55-6, tabs. 1.

The following results of greenhouse trials were based on observation 14 days after sowing the weeds (TCBC = trichlorobenzylchloride):-

Species	CDAA 4 #	CDAA 4 # + TCBC 6 #	CDAA 0.5 # + TCBC 1 #
Morning glory [Ipomoea purpurea]	0	3	3
Pigweed [Amaranthus retroflexus]	3	3	3
Wild buckwheat [Polygonum convolvulus]	1	3	0
Wild oat [Avena fatua]	3	3	3
Bromegrass [Bromus sp.]	3	3	3
Ryegrass [Lolium sp.]	3	3	3
Foxtail [Setaria sp.]	3	3	3
Crabgrass [Digitaria sp.]	3	3	3

contd.

Species	CDAA 4 #	CDAA 4 # + TCBC 6 #	CDAA 0.5 # + TCBC 1 #
Radish	0	2	1
Sugar beet	3	3	3
Soybean	0	2	3
Tomato	0	3	3
Pea	0	2	0
Sorghum	3	3	1
Maize	0	0	0
Leek	0	1	0

3 = 0-25% germination and survival
2 = 26-50% germination and survival
1 = 51-75% germination and survival
0 = 76-100% germination and survival. - D.M.L.S. [O.W.]

1890. MOORE, G.D. (Res.Serv.Dep.,Northrup, King & Co.,Minneapolis,Minnesota,U.S.A.) Experimental evaluation of herbicides for weed control in commercial corn [maize] and sorghum production. Proc.Joint Meet.16th N. Cent. & 10th West.Canad.Weed Control Conf., 1959, 51-2.
The results which were obtained in herbicide trials during 1953-9 are briefly summarised. - J.W.F. [O.W.]

1891. GARESE, P. and FOUCAULT, S.E. (Tec. Inst.Bot.Agric.,Argentina). Tratamiento de pre-emergencia con 2,4-D en maiz. [Pre-emergence treatment with 2,4-D in maize.] Rep.Est.exp.agropec.Pergamino, 1959, 74-5, (Span.), tabs.1.
2,4-D (butyl ester and triethanolamine) 1, 2, 3 and 4 kg/ha applied pre-em. to Colorado Klein maize gave excellent weed control up to harvest (the weeds in control plots included Setaria geniculata, Jaborosa runcinata, Datura ferox and Amaranthus quitensis) without adverse effect on the maize and produced yields significantly greater than the cultivated controls. Yields from 2-4 kg/ha were significantly higher than from 1 kg/ha. There was no significant difference in the yields from the ester and amine. - D.M.L.S. [G.R.I.]

1892. LOVELY, W.G. and STANIFORTH, D.W. (Iowa Agric.Exp.Sta.,Ames,Iowa,U.S.A.) Granular herbicide formulations for weed control in corn. Proc.Joint Meet.16th N. Cent. & 10th West.Canad.Weed Control Conf., 1959, 53-4.
1959 results confirmed that pre-em. granular formulations of 2,4-D, CDAA, EPTC and simazine were about as effective as sprays, though with 2,4-D, for given rates of < 2 #, control was better for sprays. Granules applied when maize was at the 1-3 leaf stage in conjunction with shallow cultivation were as good as or better than sprays. 5 formulations, granule size (24/48, 20/40, and 15/30), and carrier (bentonite, attapulgite, and Pike's Peak clay) showed very little influence on the effect, except that with simazine the 8% formulation was not as effective as the 4% and the 95 granules/in.^{2} gave better control than 47/in.^{2}. In 1 trial 2,4-D (ester) 4 # caused injury when heavy rainfall occurred soon after planting. - D.M.L.S. [O.W.]

1893. MURANT, A.F. (Norfolk Agric.Sta., Sprowston,Norwich,England). Herbicides and mechanical thinning. Proc.23rd Winter Congr., Inst.internat.Rech.Betterav., 1960, pp.8, tabs.4, bibl.7.
Endothal at 4, 6 and 9 #, endothal + propham at 3 + 3, 4.5 + 4.5 #, and 6 + 4.5 #, and OMU and BiPC at 0.5 + 0.34 and 0.62 + 0.43 # were tested on sugar beet. The mixture of endothal and propham was the most consistently successful; but gave maximum economic results only when used in combination with 2 mechanical thinnings and a mechanical weeding. The endothal-propham mixture controlled many annual grasses and broadleaved weeds, including Poa annua, Avena fatua, Polygonum spp., Stellaria media, Matricaria maritima ssp. inodora, Capsella bursa-pastoris, Veronica spp., Anagallis arvensis, Papaver spp., Fumaria officinalis, Viola tricolor, Spergula arvensis, Sonchus spp., Rumex crispus, Senecio vulgaris, and Cirsium arvense. The most important weeds not controlled were Chenopodium album and Atriplex patula; these were appreciably reduced. - P.C. [420(42)]

1894. SCHMID, G. Ein Beitrag zur Frage der Unkrautbekämpfungsmöglichkeiten in Zuckerrübenbeständen mit chemischen Mitteln.

[A consideration of the question of the possibility of weed control in sugar beet by chemical means.] Prakt.Bl.Pflbau., 1959, 54,(5),174-83, tabs.3,bibl.3.
A new herbicide Hoe 2745 [chemical name and structure not given] gives satisfactory weed control in sugar beet at 4 kg/ha in 600 l water applied 14 days before sowing. It is stated that 60-90% control may be expected, with a corresponding increase in the quality of the crop. - P.C. [C.A.]

1895. VEGA, M.R. and LLENA, P.A. (Cent. Exp.Sta.,Univ.Philippines). The effect of some newer herbicides as pre-emergence spray. Philipp.Agric., 1959, 43,(4), 250-9.
Weed control in upland rice is described. 2,4-D was found unsuitable, as only broad-leaved weeds are destroyed, allowing grasses to flourish. 2,4-dichlorophenoxy-acetamide 4.5 kg/ha and EPTC at 4.5 kg/ha largely destroyed the stand of rice. Benzac 103, a mixture of benzoic acids, gave no control of grass weeds at 0.84 kg/ha.
Neburon 4.5 kg/ha proved the most successful, both broadleaved and grass weeds being controlled by pre-em. spraying, without need for later hand-weeding.
The diethanolamine salt of 2,4-DP delayed germination; if applied after rice-plants have germinated but before weed germination, it may be of use. Further work is required on this point. - P.C. [O.W.]

1896. IBARRA, F.E. (Div.Anal.Semilla, Minist.Agric.,Buenos Aires,Argentina). La malezas mas frecuentes en los cultivos de arroz de la Mesopotamia. [The most frequent rice weeds in Mesopotamia [Argentina].] Rep.Est.exp.agropec.Pergamino, 1959, 21-2, (Span.)
The weeds are named, with some common names included. - D.M.L.S. [G.R.I.]

1897. * CIFERRI, R. [Weed associations of the peripheral rice zones and permanent rice fields.] Riso, 1960, 9,(3),15-6, (It.).

1898. CABEZON, A.G. (Shell Mex(Argentina) Ltd.,Buenos Aires,Argentina). Los herbicidas en el cultivo de arroz. [Herbicides in rice.] Rep.Est.exp.agropec.Pergamino, 1959, 76-8, (Span.)
A pure petroleum distillate (Shell 20-D) is recommended for the control of Echinochloa crus galli in rice. Spraying should be done after irrigation, when the weed overtops the rice and before it flowers. Wetting the rice should be avoided if possible. A repeat spraying to kill late germinating plants is advised. - D.M.L.S. [G.R.I.]

1899. MARSHALL, W.A.B., MORLEY, C.E.J. and ROSHER, P.H. (Imp.Coll.Trop.Agric.,St. Augustine,Trinidad,W.I.) The post-emergence use of herbicides for the control of weeds in rice in Trinidad. Emp.J.exp.Agric., 1960, 28,(111),244-54.
The following weeds were found in a limited survey of transplanted rice, although only (1), (2), (3) and (4) of these were important:- Leersia hexandra, Panicum polygonatum, P. laxum, Eragrostis hypnoides, Echinochloa colonum, Ischaemum rugosum, Hymenachne amplexicaulis, Paspalum orbiculataro, Fimbristylis miliacae (1), F. diphylla, Cyperus ligularis, C. rotundus, C. lazulae, Sphenoclea zeylanica (2), Jussiaea decurrens (3), J. linifolia (4), Commelina elegans, Pterolepis glomerata, and Phylla betulaefolia. In transplanted rice, (2), (3) and (4) were best removed by hand. 2,4-D (sodium) 0.75 # or MCPA 0.75 # gave good control of (1) without injuring rice when applied at the rapid tillering stage. Dinoseb (ammonium) 0.75 # gave excellent control of (2). MCPA 0.75 # + dinoseb 0.75 # gave good control of (1), (2), (3) and (4). Amitrole 8 # gave partial control of (2) and chlorpropham 0.375 # stimulated (1).
In directly sown rice, complete control of (1) and (2) was obtained when MCPA 0.75 # + dinoseb 0.75 # were applied 5-6 weeks after sowing. - J.W.F. [O.RE.]

1900. DETROUX, L. and WAUTHY, R. (Sta. Phytopharm.,Gembloux,Belgium). Complements a l'etude du desherbage chimique des champs de betteraves. [Further studies of chemical weed control in sugar beet fields.] Publ. techn.I.B.A.B., 1959, 3,145, (F.f.flemish.e.), tabs.4.
Results in weed control and sugar beet yield are given of 1959 trials in which the following herbicides were applied with cultivation 9 days before sowing (I) and with the normal cultivation 1 day before sowing (II):- neburon wettable powder (18.5%) 3 kg/ha pre-em., mixture of cyclo-octyldimethylurea (OMU) 14.9% and butinol-chlorophenyl carbamate (BiPC) 10.2% (wt/vol)

emulsifiable solution 4 l/ha pre-em. and 0.4% + 0.275% granular 200 kg/ha post-em., PCP 10% (wt/vol) emulsifiable solution 40 l/ha pre-em., calcium cyanamide ($CaCN_2$) powder, 18.5%, 285 kg/ha pre-sowing, sodium nitrate ($NaNO_3$) powder, 16%, 320 kg/ha post-em., and DCU wettable powder, 73%, 20 kg/ha at sowing. $CaCN_2$ and the granular OMU/BiPC were applied dry by hand. The volume rate of the other treatments was 800 l/ha.

(I) reduced yields and is considered inadvisable. With (II), $NaNO_3$ gave the best result, in confirmation of previous experience. OMU/BiPC spray and DCU gave the best weed control but slightly reduced yields. PCP gave satisfactory weed control without affecting yield and $CaCN_2$ increased the yield but gave poor weed control. Neburon gave both poor weed control and yield reduction. In further trials OMU/BiPC spray at 4 l/ha proved more toxic to beet post-em. than pre-em. but gave better weed control pre-em. With the granular, 100 kg/ha was insufficient; 150 and 200 kg/ha reduced yields but less so post-em. than pre-em.; the reduction after 150 kg/ha was not significant.

When equal nitrogen was applied after singling (1) as nitrate of lime, and (2) in OMU/BiPC granular of which the base is nitrate of lime, the fertilising action of the nitrogen was markedly reduced in (2).

In preliminary trials to be confirmed, treatment of beet seed with gibberellic acid (powder 0.88%) at 1.25 g/kg of seed appeared to have a minimal effect on beet yield and in countering the harmful effect of neburon.

Dalapon 15 kg/ha, TCA 50 kg/ha and simazine 0.750 kg/ha applied 2.5 months pre-sowing and DNOC (sodium) 10 kg/ha applied 1.5 months pre-sowing controlled weeds until singling without appreciable effect on yield, but this technique is scarcely practicable on ploughed soils which are generally rough and sodden during the winter.

Sodium nitrate has proved much more promising than calcium cyanamide and can be sprayed post-em. over the rows at 80 kg/ha in 200 l water without risk of reducing the sugar content. Fan jets facilitate application.

Of the triazines, simazine and trietazine at 0.125 kg/ha appear the least toxic to beet but conditions in 1959 were abnormally dry. Atrazine reduced yields by 50%. Endothal 19.2% at 40 l/ha applied at sowing or pre-em. gave good weed control without appreciable effect on yield. Chlorpropham pre-em. was promising but 4 and 6 l/ha of 40% were apparently too high. - D.M.L.S.

[103(493)]

1901. MORKEN, O. and VIDME, T. Forsøk med kjemiske midler mot ugras i potetåker 1950-1956. [Trials on chemical weed control in potatoes, 1950-1956.] Forskn.Fors. Landbr., 1960, 11,(5),459-82, tabs.8, bibl.16.

In 41 trials at different locations in Norway during 1950-51, MCPA at 270 g, dinoseb at 130 g and MCPA 135g + dinoseb 65 g/ha were applied each in 100 l spray vol. to potatoes at emergence.

Oiled $CaCN_2$ at 50 kg/decare was applied at emergence in 1950, and at 2 weeks after planting (about 1 weed before emergence) in 1951-2. In a record series of 10 trials in 1954-6, MCPA at 150 kg/decare was applied at emergence, or at 1, 2 or 3 weeks after emergence. With each treatment, half the plots received (a) full mechanical weeding and earthing-up, while the other half were (b) earthed-up only. During the first trial series in 1950-3, mean total tuber yields of control plots were 2391 and 1843 for (a) and (b) respectively. On (a) plots, MCPA reduced mean yields by 65 kg (significant), while dinoseb and MCPA + dinoseb increased mean yields by 70 (non-significant) and 27 kg, respectively. On (b) plots, MCPA, dinoseb and MCPA + dinoseb all gave highly significant mean yield increases of 282, 471 and 457 kg/decare, respectively. The dry matter content of the tubers was not materially affected by the treatments. All treatments had similar effects on Chenopodium album and gave 80-90% control. Dinoseb and MCPA + dinoseb gave effective control of Stellaria media, Capsella bursa-pastoris, Galeopsis spp., Senecio vulgaris, Erysimum cheiranthoides, Matricaria inodora, Matricaria matricarioides and Myosotis arvensis. With Cirsium arvense and Rumex domesticus, MCPA was required to give effective control. Spergula arvensis, Polygonum spp., Rumex acetosella and Achillea ptarmica were not controlled by these herbicides. On (a) plots, in the second series of trials, applying MCPA later than at emergence reduced tuber yields; on (b) plots, applications made 2-3 weeks after emergence did not reduce yields. MCPA did not cause off-flavours in the tubers. It was concluded that MCPA, applied as soon as the first sprouts appeared above ground, was best and that this would reduce the labour requirement for weed control by about 50%. - P.J.B.

[54(481)]

1902. DENMARK. Forsøg med midler til draebning af kartoffeltop. [Trials with chemicals for killing potato haulms.] Medd. Stat. Forsøgsvirk. Plkult., 1960, 646, pp.4, (Dan.)
In trials at 4 locations, the following haulm-killers were applied in 800 l spray volume/ha to partly-green potato haulms: sodium chlorate 12 kg/ha, monochloracetate 20 kg/ha, DNOC 24 kg/ha, PCP 50 l/ha and dinoseb 6 l + diesel oil 60 l/ha. PCP and dinoseb + diesel oil resulted in the most rapid haulm killing and DNOC the slowest, though differences between treatments at 10 days after application were not great. There was virtually no effect on vascular ring discoloration, on the capacity of tubers to sprout or on cooking quality. - P.J.B. [99(489)]

1903. SCHMIDT, O. Versuche zur chemischen Krautabtötung mit Raphatox und Dieselöl. [Research on chemical destruction of vegetation with Raphatox and diesel oil.] Kartoffelbau, 1959, 10,(7), 153-4, tabs.3.
Trials were carried out in Pomerania in 1954-5 of methods of (a) facilitating potato-harvest and destroying late germinating weeds; (b) checking spread of Phytophthora and virus infections. Raphatox (DNOC, proportion not stated) achieved these objects cheaply and effectively. The most effective mixture was Raphatox 10 kg/ha + diesel oil 30 l/ha + 1.5 l emulsifier. Aqueous solutions of 15 kg/ha proved uneconomic owing to the bulk required. Preliminary laying of the vegetation by rolling was essential. Current costs are quoted. - P.C. [247(43)]

1904. BARNES, H. (King & Anderson, Inc., Clarksdale, Mississippi, U.S.A.) The hoe must go. Crops & Soils, 1960, 12,(9), 21-2, figs.2.
Includes the information that Dicryl [N-(3,4-dichlorophenyl)methacrylamide] [rate not specified] eliminated heavy infestations of pigweed [Amaranthus retroflexus] and crabgrass [Digitaria sanguinalis] in a cotton field without injuring the cotton.
It is recommended that to control grasses in cotton, directed sprays of Dicryl should be applied in 12-14 in. bands along the rows when the cotton is established and before the grasses are 1 in. high. - D.M.L.S. [O.W.]

1905. RIGONI, V. (Est. exp. Manfredi, Pergamino, Argentina). Maleza del mani en Cordoba. [Weeds of groundnuts in Cordoba (Argentina).] Rep. Est. exp. agropec. Pergamino, 1959, 20-1, (Span.)
The principal weeds are named. - D.M.L.S. [G.R.I.]

1906. MORGAN, B.S. (Agric. Chem. Div., U.S. Rubber Co., 106 Brunswick Drive, Greenwood, Indiana, U.S.A.) Post-emergence application of NPA (Alanap) and Falone (tris(2,4-dichlorophenoxyethyl)phosphite) granules on soybeans. Proc. Joint Meet. 16th N. Cent. & 10th West. Canad. Weed Control Conf., 1959, 53.
Soybeans (var. Harasoy) 3-4 in. high and giant foxtail (Setaria faberi) seedlings 1-2 in. high were treated post-em. with granular NPA and tris(2,4-dichlorophenoxyethyl)phosphite [3Y9] at 2, 4 and 8 # applied as a 14 in. band centred over the row. Granules were formulated as 10% active material on a 15/30 attaclay carrier. Four weeks after treatment giant foxtail showed distinct blade browning and malformation of the growing tip in all plots treated with NPA granules; this effect persisted and resulted in practical control by mid-season. 3Y9 at 4 and 8 # gave similar control. No rate caused injury to the soybeans. - J.W.F. [O.W.]

1907. SMITH, C.S. Renovation of pastures. Herbicides in the improvement of marginal land. World Crops, 1960, 12,(9),342-4, figs.2.
The proceedings of a conference held in Scotland in 1960 on the renovation of hill pastures by means of herbicides are reviewed briefly. - P.J.B. [O.W.]

1908. EVANS, G. (Welsh Plant Breed. Sta., Aberystwyth, Wales). Density of grasses for seed production. Rep. Welsh Plant Breed. Sta. 1959, 1960, 88-93, bibl.7.
In seed production trials with grasses, results have shown that much lower plant densities than those regarded as normal are sufficient to give maximum seed yields of grasses sown in rows and that it is more profitable to sow thinly and use selective herbicides for weed control than to sow thickly in an attempt to smother weed growth. - P.J.B. [O.W.]

1909. LEE, W.O. (Crops Res. Div., Oregon State Coll., U.S.A.) Weed control in forage seed crops. Proc. 19th Ann. Meet. Oregon Seedgrowers League, 1959, 51-5.

EPTC pre-planting at 4 and 6 # controlled grasses and checked broadleaved weeds in leguminous crops grown for seed. Adding 2,4-D 2 # had no effect, while 4 # severely damaged the clovers.

Propham, chlorpropham and EPTC were compared as pre-planting/soil-incorporated, as pre-em., and as post-em. applications, all at 4 #. Results were equivalent, but propham was most economic. MCPA 0.25 # applied in March controlled hairy vetch [Vicia hirsuta] in crimson clover; and for control of charlock [Sinapis arvensis] and wild radish [Raphanus raphanistrum] should be applied when the clover is at the third leaf stage.

Granular formulations of chlorpropham applied when soil is moist proved the most effective herbicide in attempted control of dodder [Cuscuta spp.].

Diuron post-em. 2-2.5 # did not injure Festuca alta or Poa agrestis but other fescues were damaged. Simazine and atrazine damaged all leguminous crops. Propham and chlorpropham injured all grasses under test when applied in the autum.

Diuron and MCPA in combination showed promise for the control of sheep sorrel [Rumex acetosella]. - P.C. [76(79.5)]

1910. ASHFORD, R. The control of weeds in new seedings. Forage Notes, 1959, 5,(2), 36.

A satisfactory method for controlling annual weeds in forage stands at Smithers, B.C. was to prepare a seedbed as early as possible in spring, spray with 2,4-D (ester) 1.3-1.5 # a.e. when weeds were 9 in. tall, disk cultivate and harrow 14 days after spraying, then sow forage crops. Where this method was used for lucerne, no residual effects of 2,4-D were noted and extremely good weed control was achieved for most of the growing season. Lucerne sown on plots not treated with 2,4-D had to be cut 3 or 4 times to control weed growth. - Herb. Abstr., 30,(3),1146.

1911. MARSICO, O.J. La semilla de forrajeras como medio de difusion de las malezas. [The spread of weeds by means of forage grass seed.] Rep.Est.exp.agropec.Pergamino, 1959, 17-20, (Span.)

The impurity of commercial forage grass seed and the need for further legislation and seed inspection is discussed. - D.M.L.S. [G.R.I.]

1912. KENYA. Herbicides conference. Management of grassland. Kenya Fmr, 1960, 45,15,26.

A report of a conference held at Muguga on 15th March, 1960 which was attended by 36 delegates from Kenya, Uganda and Tanganyika and 1 from the U.K. Subjects discussed included couch control in coffee, tea, sisal, pyrethrum and sugar cane. - D.M.L.S. [G.R.I.]

1913. QUAGLIOTTI, F. and LOVATO, A. (Ist. Agron.Gen.Colt.erb.,Univ.Bologna,Italy). Influenza dell'irrigazione e dell'epoca dei tagli su la produttivita, longevita e diffusione di erbe infestanti nel medicaio. [Influence of irrigation and time of cutting on productivity, longevity and weed infestation in lucerne.] Ann.Sper.agrar., 1959, (n.s.), 13,(6),1051-75, (It.it.e.), figs. 11,tabs.8,bibl.15.

In a 3 year trial on a 1 year old lucerne meadow, irrigation (some days after cutting) perceptibly stimulated weed growth, especially of grasses, particularly in the third year, and did not significantly increase herbage dry matter production over the 3 years though it did in the first year. When 3 times of cutting - (1) at the beginning of flower head emission, (2) at half-flowering, and (3) at full flowering - were compared, weed infestation was greatest the later the cutting. - D.M.L.S. [G.R.I.]

1914. * RABOTNOV, T.A. The effect of Rhinanthus major Ehrh. on the yield and composition of grasses of the floodland meadows. Moskov.Obsheh.Isp.Prirody B. Otd.Biol., 1959, 64,(6),105-7.

Includes control through sowing red clover.

1915. COVAS, G. (Est.Exp.Nac.Anguil,La Pampa,Argentina). Algunos aspectos de la maleza en la region semiarida central. [Some aspects of weeds in the semi-arid central region.] Rep.Est.exp.agropec. Pergamino, 1959, 28-30, (Span.)

Weeds are considered in relation to (1) the establishment of permanent pastures, and (2) cultural methods designed to counter erosion. Sowing alternate rows of rye or wheat with certain forage grasses (or 1 row of rye or wheat to 2 of the forage grass) has proved a good method of controlling weeds and establishing a perm-

anent pasture. A successful method of countering erosion has been to alternate uncultivated weedy bands 50 in. wide with bands cultivated and sown with a cereal. The weedy bands give protection until the growth of the cereal permits their removal by cultivation. The bands are transverse to the direction of the prevailing winds. 2,4-D (isopropyl ester 44%) 1 l/ha controls Kochia scoparia, Chenopodium hircinum, Descurainia argentina, Erysimum repandum and Sisymbrium irio. Bowlesia tenera required 3 l/ha. - D.M.L.S. [G.R.I.]

1916. SERRANO, H. and ECHEVERRIA, I. La maleza de los alfalfares de la region de Pergamino. [Lucerne weeds in the Pergamino region.] Rep.Est.exp.agropec. Pergamino, 1959, 15-17, (Span.), tabs.1.
Includes a list of the worst weeds in lucerne in the Pergamino zone. - D.M.L.S. [G.R.I.]

HORTICULTURAL, ORNAMENTAL AND PLANTATION CROPS

See also 1874,1877,1881,1889, 1985,2088.

1917. HEIKES, E. (Montana State Coll., Bozeman,Montana,U.S.A.) Chemical weed control in lawns and gardens. Bull.Montana State Coll., 1960, 308,pp.28, figs.11, tabs.6.
A list of some 23 selective herbicides useful for use on lawns and in gardens is given, with notes and tables on their use, and illustrations of 10 of the commoner weeds found in gardens in Montana. - P.C. [13(78.6)]

1918. MILLER, R.A. (Box 58,Downers Grove, Illinois,U.S.A.) Pre-emergence on eight vegetable crops with several herbicides. Proc.Joint Meet. 16th N.Cent. & 10th West. Canad.Weed Control Conf., 1959, 46, tabs.1.
As a result of a trial with EPTC (granular and spray incorporated) 3 #, amiben,6 #, chlorpropham (granular) 4, 8 and 12 #, dimethyl 2,3,5,6-tetrachloroterephthalate (DAC-893) 8 #, dinoseb 4 #, dalapon 25% + 2,4,5-TP 6.25% (D/S) 1.55 #, and CDAA (granular) 4, 8 and 12 # the following are listed as 1st, 2nd or 3rd choices in the crops named: Tomatoes - CDAA 4 # (2nd), EPTC (spray) (3rd); Cabbage - CDAA 4 # (1st), DAC-893 (2nd); Onions - DAC-893 (1st), chlorpropham 8 # (2nd), CDAA 4 # (3rd); Carrots - DAC-893 (1st), chlorpropham 8 # or EPTC (spray) (2nd); Beets - EPTC (spray) (2nd); Peas - DAC-893 (1st), dinoseb (2nd), CDAA 4 # (3rd); Bush snap beans - DAC-893 or EPTC (1st), dinoseb or CDAA 4 # (2nd); Sweet corn - CDAA 4 # or DAC-893 (2nd), dinoseb or D/S (3rd).
The following caused injury (* indicates mortality and 0 severe injury): Onions - EPTC 0, amiben 0, chlorpropham 4 and 12 #, dinoseb 0, D/S, CDAA 4 #, 8#0 and 12 # 0; Cabbage - EPTC, amiben 0, chlorpropham 4-12 # 0, DAC-893, dinoseb 0, D/S 0, CDAA 4 #, 8 # 0 and 12 # 0; Sweet corn - EPTC, amiben 0, chlorpropham all rates, dinoseb; Snap beans - EPTC, amiben 0, chlorpropham 12 #, dinoseb, D/S, CDAA all rates; Tomatoes - EPTC, amiben 0, chlorpropham all rates 0, DAC-893 *, dinoseb, D/S, CDAA 4 and 8 #, 12 # 0; Carrots - EPTC, amiben 0, chlorpropham 4 and 12 #, DAC-893 (very slight), D/S 0, CDAA all rates *; Peas - EPTC, amiben 0, chlorpropham all rates 0, dinoseb (slight), D/S, CDAA all rates; Beets - amiben 0, chlorpropham 8#, 12 # 0, DAC-893, dinoseb (slight), D/S, CDAA 4 #, 8 # 0, 12 # *. - D.M.L.S. [O.W.]

1919. IVENS, G.W. and ROBERTS, H.A. (A.R.C. Weed Res.Org.,Begbroke,Oxford,England). Horticultural uses of the substituted urea herbicides. Agric.Vet.Chem., 1960, 1,(3), 148-50 and 152, tabs.2, figs.1.
The characteristics and uses of fenuron, monuron, diuron, neburon and mixtures of fenuron and diuron with other herbicides are reviewed. - P.J.B. [O.W.]

1920. van STAALDUINE, D. Onkruidbestrijding met chloor-IPC in de groenteteelt. [Weed control with chlorpropham in vegetable crops.] Groenten en Fruit, 1959, 14,(37), 1079 and (3),1103, tabs.2.
The mode of action of chlorpropham and the susceptibility to it of crops and weeds are reviewed, together with the effect of soil type, crop, rainfall, temperature, time of application and tillage on its effectiveness. Practical recommendations are given for the use of chlorpropham and, in some cases, herbicidal oils, sulphuric acid and PCP, for controlling weeds in endive, lettuce, chicory, scorzonera, beans, carrots, leeks and asparagus. Results are given of trials with carrots in 1958 on sandy clay soil, in which PCP at 8 or 16 kg/ha (20 or 40 l of

40% PCP in oil/ha) 1 or 2 kg chlorpropham/ha, or combinations of each rate of both herbicides in 100 l spray volume. The carrots were sown on 15th April and sprayed on 28th April. Weed control was considerably better where 1 or 2 kg chloropropham was added to the PCP; yields also were highest for the PCP + chlorpropham treatments and ranged from 20 to 30% higher than where one weeding was carried out. - P.J.B. [201(492)]

1921. PIRTTILA, H. (Dep. Plant Husbandry, Agric. Res. Cent., Tikkurila, Finland). Allyylialkoholi puutarhaviljelysten rikkaruohontorjunta-aineena. [Use of allyl alcohol for weed control in horticulture.] Maatalous ja Koetoiminta, 1960, 14, figs.2, tabs.2. [16(471)]

1922. GLEASON, L.S. (Development Dep., Monsanto Chem. Co., St. Louis, Missouri, U.S.A.) "Randox T", a new broad spectrum pre-emergence herbicide. Proc. Joint Meet. 16th N. Cent. & 10th West. Canad. Weed Control Conf., 1959, 54-5.

Randox T is a 3:7.5 mixture of CDAA and trichlorobenzyl chloride which has been found to be non-injurious to maize. Rates 5 times as high as those recommended have not resulted in toxic residual effects. It also shows promise for use in onions, peas, carrots and lima and pole beans; it is toxic to soybeans. Its acute oral toxicity to rats is ca. half that of 2,4-D. Like CDAA it is irritating to skin and eyes and requires the same precautions. Subject to obtaining label clearance on a no-residue basis for use in maize, it will be generally available in the U.S.A. in 1960 in both liquid and granular formulations. - D.M.L.S. [O.W.]

1923. * ZABOLOTSKY, N. [Use of propham and chlorpropham for weed control in vegetables.] Rep. Timiryazev agric. Acad., 1956, 6, 75-81, (Russ.)

1924. VERLAAT, J.G. (Proefst. voor Groenteteelt in de Vollegrond, Alkmaar, Netherlands). Chemische onkruidbestrijding op preizaaibedden. [Chemical weed control in leek seedbeds.] Groenten en Fruit, 1960, 15, (35), 1088-9, figs.1, tabs.2.

In trials at 2 locations in the Netherlands, the following sowing methods for leeks in early spring were compared: (a) broadcast, raked in and pressed, (b) broadcast, no other treatment, (c) drilled in rows and pressed. These treatments were each combined with 8 different weed control methods. The results of the sowing-method trials indicated the superiority of row-drilling the seed, where subsequent applications of herbicides were to be made. From the results of the herbicidal trials, the following recommendations were made. For immediate post-sowing treatments, 40-50 ml 40% chlorpropham /are in 4-8 l water is suitable, though not on very light soils. This is ineffective against Senecio vulgaris. As a pre-em. treatment for use immediately before emergence, PCP in oil (0.3-0.4 l/are), sulphuric acid or herbicidal oils are all suitable. PCP should not be applied at more than 5 days before emergence and not on very light, humus-poor soils. To obtain some residual effect, a mixture of PCP + chlorpropham (each at rates at which they are normally used alone). Sulphuric acid at 0.6-0.8 l/are in 10 l water is very effective, or 6-10 l of herbicidal oil, which will give good control of grass weeds and is suitable for soils too light for chlorpropham and PCP. For post-emergence use, when the leeks are 6-8 cm high, chlorpropham, sulphuric acid, DNOC and dinoseb are all suitable. - P.J.B. [200(492)]

1925. WARREN, G.F. (Purdue Univ., Lafayette, Indiana, U.S.A.) New chemicals that show promise for weed control in carrots. Proc. Joint Meet. 16th N. Cent. & 10th West. Canad. Weed Control Conf., 1959, 47.

EPTC pre-sowing killed or severely injured carrots when used at rates sufficient to give effective weed control. Karsil (N-(3,4-dichlorophenyl)-2-methylpentanamide) post-em. gave better control of galinsoga [Galinsoga ciliata] and lambsquarters [Chenopodium album] than Stoddard solvent, but poorer control of annual grasses unless they were sprayed when < 1 in. high. Carrots showed good tolerance to Karsil at 4 # at the 1-true-leaf stage.

Solan (N-(3-chloro-4-methylphenyl)-2-methylpentanamide) and Dicryl (N-(3,4-dichlorophenyl)methacrylamide) also gave good selective post-em. control of weeds in carrots when used at slightly higher dosages. - J.W.F. [O.W.]

1926. ARNDT, F. (Inst. Pflanzenschutz, Stuttgart-Hohenheim, Germany). Untersuchungen über die Eignung verschiedener Herbizide im Vor-Auflaufverfahren zur Unkrautbekämpfung in Rüben, Zwiebeln und Karotten. [Research on the suitability of various herbicides used pre-emergence in beet, onions and carrots.] Gartenbauwiss., 1959,

24,(1),108-41, figs.15,tabs.9,bibl.84.
Experiments were conducted during 1955-6 to determine the value of 2,4-DES, monuron, PCP, chlorpropham; and of combined applications of chlorpropham + PCP, propham + monuron, chlorpropham + DNOC, and PCP + monuron in carrots, sown onions, and sugar beet.
The action of 2,4-DES was largely inhibited by dry cold weather, while all the crops exhibited severe damage when sprayed pre-em. in damp weather with temperatures of over 70°F - the toxicity of 2.7 kg/ha 2,4-DES being doubled in these conditions. Post-em. spraying with 2,4-DB however seemed possible. - P.C. [249(43)]

1927. HERRON, J.W. and COTTER, D.J. (Dep.Hort.,Univ.Kentucky,Lexington,Kentucky, U.S.A.) Effects of post-transplanting herbicidal treatments on tomatoes. Proc. Joint Meet.16th N.Cent. & 10th West.Canad. Weed Control Conf., 1949, 46-7.
When applied over the plants 3 days after planting, none of the following caused significant top injury or significant yield reductions:- simazine 1 #, diphenylacetonitrile (Lilly 13489) 4 and 8 #, (p-chlorophenyl)phenylacetonitrile (Lilly 09726) 4 and 8 #, CDEC 4 and 6 #, CDAA 4 and 6 #, neburon 2 and 4 #. Simazine 2 # caused injury and reduced yields but not significantly. In a screening rial EPTC and 3Y9 were not promising. - D.M.L.S. [0.W.]

1928. RAKE, L. and HOLM, L. (Univ. Wisconsin,Madison,Wisconsin,U.S.A.) The response of snapbeans and weeds to Eptam under different environmental conditions. Proc.Joint Meet.16th N.Cent. & 10th West. Canad.Weed Control Conf., 1959, 45-6.
EPTC was applied to the soil at 3, 6 and 9 # at the following times: (1) 7 days, (2) 4 days and (3) immediately before sowing, all incorporated, and (4) just after sowing (pre-em.). 0.5 in. rain fell the morning following sowing and 0.5 in. 3 days later. Treatments (1), (2) and (3) gave almost complete weed control 1 month later, while treatment (4) gave only 50% control (the predominant weeds were Chenopodium album, Amaranthus retroflexus, Mollugo verticillata, Ambrosia artemisiifolia, Portulaca oleracea and Setaria spp.). Although EPTC at 6 and 9 # caused severe leaf injury to the snapbeans early in the season, no significant differences in yield were found from any of the treatments.

To study the influence of rainfall (irrigation) on the response of snapbeans and weeds, the following treatments were made: (1) beans sown and irrigated immediately, (2) beans sown, EPTC 5 # sprayed on soil surface and irrigated immediately, (3) EPTC 5 # incorporated, then irrigation and then beans sown and (4) EPTC 5 # incorporated, then irrigation and beans sown 7 days later. Appropriate areas in all the treatments received 1, 2 and 4 in. of irrigation and an additional 1.5 in. rain fell during a 10 day period after sowing. All treated plots showed excellent weed control; no differences in weed control could be detected under different levels of irrigation; and there was no significant effect on yield from method of treatment or irrigation level. Cucumbers sown in the treated plots after the beans did not survive. Two months later soil samples were taken at intervals of 20 in. in all areas and no toxicity to cucumbers was detected in any sample. - J.W.F. [0.W.]

1929. CAMPAGNA, E. and MARCOTTE, M. Desherbage chimique dans les cultures de choux de Siam. [Chemical weeding of Siamese cabbage crops.] Rapp.Minist.Agric.Quebec 1958-59, 1959, 56.
The best results were given by pre-em. treatment with TCA, dalapon or potassium cyanate, each at 32 #, or by pre-sowing treatment with dalapon at the same rate. Post-em. treatments proved unsatisfactory, and there was some crop injury from the pre-em. applications of TCA and dalapon. - Hort.Abstr., 1960, 30,3688.

1930. NEURURER, H. (Bundesanstalt für Pflanzenschutz Vienna,Austria). Erfahrungen in der Anwendung von Plastikfolien zür Unkrautbekämpfung in Gemüse-Zierpflanzen- und Buschobstanlagen. [Experiences in the use of plastic sheets in weed control in vegetables, ornamental plants and bush fruit orchards.] Pflanzenarzt, 1959, 12,(11), 116-7, figs.2.
Black plastic sheets may be applied to the soil either before or after planting or sowing crops. In the former case holes or slits are cut for putting in seeds or plants; when laid over the plants, spaces are cut for them. Weed growth is completely checked and the soil remains moist, provided that the plastic is laid carefully and held so flat to the ground that wind cannot lift it.
Owing to its high cost, this procedure is economic only in intensive culture. - P.C. [54(436)]

1931. GARESE, P.L. (Summarizer). (Est.Exp. Balcarce,Buenos Aires,Argentina). Uso de herbicidas selectivos en cultivos menores: ajo, arveja y lenteja, cebolla, frutilla, papa y zanahoria. [The use of selective herbicides in minor crops: garlic, peas and lentils, onions, strawberries, potatoes and carrots.] Rep.Est.exp.agropeo.Pergamino, 1959, 56-63, (Span.)

Includes the following recommendation for the control of Chenopodium spp. in lentils: 2,4-D (ester) 0.025-0.038, (triethanolamine) 0.160-0.2 and (alkanolamine) 0.117-0.195 kg/ha, and MCPA (sodium) 0.075-0.1 kg/ha, applied when the lentils are 10-20 cm high and the weed 5-20 cm high. -- D.M.L.S. [G.R.I.]

1932. BURGIS, D.S. and OVERMAN, A.J. (Gulf Coast Exp.Sta.,Bradenton,Florida,U.S.A.) Vapam and VPM soil fumigant must be applied properly to be effective. Fla State Hort. Soc.Proc., 1959, 72,112-3.

Vapam [SMDC] injected 5-6 in. below the soil surface 10-14 days before sowing tomatoes allows the seedlings to emerge in a weed-free band 8-10 in. wide. Conditions necessary for this treatment to be effective are stated as follows: (1) the soil must be in a good 'seed-bed' condition to allow ready gaseous diffusion; (2) after treatment the soil must be smoothed to form a compact bed; (3) for effective weed control the weed seeds must absorb water, as the vapours will not penetrate a dry seed-coat; (4) when treated, the soil should be moist to the surface; (5) soil temperature must be at least 60°F at a depth of 2 in., (6) after treatment, every precaution must be taken to insure against contamination by fertilisers, cultivating tools, or untreated soil. - J.W.F. [41(75.9)]

1933. MASTALERZ, J.W. Weed control under greenhouse benches. Pa Flower Grs' Bull., 1959, 103.

Monuron 1 oz/200 ft^2 in sufficient water to give good coverage, is safe and long lasting for greenhouse use. It acts through the roots, so it should not be applied in houses with ground beds unless these have watertight bottoms. Sodium arsenite and Stoddard solvent may also be used, but the former is corrosive and the latter is non-persistent. 2,4-D should never be used in greenhouses. - Hort.Abstr., 1960, 30,3654.

1934. ADAMSON, R.M. (Dep.Agric.,Vernon, British Columbia,Canada). Weed control practices in bulbs and ornamentals. Res.Rep. Joint Meet.16th N.Cent. & 10th West.Canad. Weed Control Conf., 1959, 14,15.

Includes the information that in British Columbia monuron 2.5-3 # + chlorpropham 4 # applied before weed emergence in the autumn is effective for broad-leaved weeds, grasses and volunteer cereals in Easter lilies, often giving weed-free conditions until bulb harvest the following July. In western Washington, dinoseb (amine) 4.5 # is recommended for autumn spraying, with chlorpropham 4 # added where grasses or cereals are a problem. - J.W.F. [O.W.]

1935. HARRIS, H.M., SCHULDT, P.H. and LIMPEL, L.E. (Diamond Alkali Co.,Res.Cent., Painesville,Ohio,U.S.A.) Dimethyl 2,3,5,6-tetrachloroterephthalate (DAC-893), a promising pre-emergence turf herbicide. Proc.Joint Meet.16th N.Cent. & 10th West. Canad.Weed Control Conf., 1959, 48, tabs.2.

Pure DAC-893 is a white crystalline compound with a low vapour pressure and is essentially odourless. Its solubility in water is $<$0.5 p.p.m. and it is sparingly soluble in acetone, cyclohexanone, xylene, and petroleum-derived solvents. It appears to be stable in the pure state or when formulated as a wettable powder under usual storage conditions. Tests to date indicate the acute oral LD 50 for male albino rats to be $>$3000 mg/kg body weight, and the acute dermal LD 50 for albino rabbits $>$10 000 mg/kg body weight.

The results are given of 3 trials for the control of Digitaria sp. in turf. These and other work indicate 10-12 # to be the optimum rate for this purpose. In 1 trial 6-12 # gave better control than chlordane 60 #. In another trial the effect of DAC-893 at 7.5 # was not impaired by the addition of chlordane 10 # or 2,4-D 2 #. At 5 # granules were less effective than sprays. Dry weather precluded any evaluation of the effect on turf grasses, but work at the Boyce Thompson Institute has shown that DAC-893 has little if any effect on established bluegrass even at levels higher than those required to kill crabgrass,but some thinning of fescues may occur. Autumn sown fescue after a spring application of DAC-893 12 # has not been adversely affected. - D.M.L.S. [O.W.]

1936. NEURURER, H. (Bundesanstalt für Pflanzenschutz,Vienna,Austria). Wie halte ich Gartenwege mühelos unkrautfrei? [How can I keep garden paths free of weeds without trouble?] Pflanzenarzt, 1960, 13,(1),2.

Includes the information that the residual effect of a mixture of 2,4-D, 2,4,5-T and TCA (sodium) has been found to be very long, both on garden paths and on uncultivated areas. - P.C. [53(436)]

1937. SWITZERLAND. (J.A.Geigy S.A., Basle,Switzerland). The use of simazine as a weedkiller in woody crops such as nurseries, ornamental trees and shrubs, forest nurseries. Publ.Pest.Control Dep., Geigy,1959, pp.20.

The results of trials with woody species of importance to horticulture indicated that the following were most susceptible of those tested: Abies homolepis, Larix decidua (L. europaea), Pinus laricio corsicana, Pseudotsuga douglasii, Betula pubescens, Genista juncea, Spirea bumalda froebelii, Deutzia gracilis, Escallonia organensis, Ribes nigrum, R. sanguineum, Tilia cordata, T. platyphyllos, Fraxinus aurea and Ligustrum ovalifolium. Families particularly susceptible to simazine were: Saxifragaceae, Oleaceae, Betulaceae, and Tiliaceae. Among the Rosaceae, the genus Spirea was exceptional in being susceptible. Recommendations are made for testing simazine for the control of annual and perennial weeds [not specified] in more than 300 woody species. - P.J.B. [O.W.]

1938. WOOD, C.A. (Scottish Hort.Res. Inst.,Mylnefield,Invergowrie Dundee, Scotland). Report on weed control experiments. 7th Ann.Rep.Scottish Hort.Res. Inst. 1959-60, 1960, 17-9.

Atrazine 2 and 4 ℔ applied to raspberries in mid-April gave very good weed control with no evidence of cane damage; further work is needed in more moist conditions to establish its complete safety, as it is more soluble than simazine. Simazine gave control at 2 ℔, and even at 6 ℔ did not damage the canes. Monuron and diuron at rates sufficient to control weeds both caused slight leaf chlorosis on the canes. In experiments designed for trial of annual treatments simazine, monuron and 2,4-DES (4.6 ℔) ± propham (4 ℔) or ± fenuron (0.5 ℔) all gave excellent control until midsummer. Rotary cultivations however, prolonged control for the year.

Pre-planting sprays of simazine, atrazine, monuron and diuron caused total loss of strawberry runners. 2,4-DES 3.6 ℔ + fenuron 0.5 ℔ caused severe leaf chlorosis. Simazine, however, if sprayed on established plants was virtually harmless and gave good weed control at 1.5 and 3 ℔.

Dalapon gave reasonable control of grass among apple trees, as also in potatoes when mixed at 5 ℔ with dinoseb (amine) 6 ℔. - P.C. [O.W.]

1939. HEMPHILL, D.D. (Missouri Agric.Exp. Sta.,Columbia,Missouri,U.S.A.) Weed control in establishing strawberry plantings. Proc. Joint Meet.16th N.Cent. & 10th West.Canad. Weed Control Conf., 1959, 45.

Autumn-germinating broadleaved weeds are controlled satisfactorily with late autumn (early November) applications of 2,4-D and grasses by dinitros or chlorpropham applied when strawberries are dormant. Weeds from viable seeds in cereal straw mulches can be controlled by chlorpropham 2 ℔ applied on top of the mulch in late winter while strawberries are still dormant. Spring applications of 2,4-DES, CDAA, 3Y9, simazine and trietazine after mulch removal and resumption of strawberry growth all resulted in severe injury and yield reductions, except for 2,4-DES, which did not control crabgrass [Digitaria sp.] germination during fruiting. When applied in early May to var. Blakemore as flowering began, no injury was caused by granular formulations of 2,4-D 2 ℔, chlorpropham 10 ℔, CDAA 10 ℔, 3Y9 6 ℔ and EPTC 10 ℔. The 2,4-D controlled crabgrass germination until the end of the season as well as broadleaved weeds already germinated. However, when the same treatments and granular formulations of neburon 4 ℔ and amiben 6 ℔ were applied to Earlidawn strawberries in bloom, 2,4-D and amiben caused severe injury and reduced yields. Yield from EPTC was also slightly reduced. A further trial in which 2,4-D granular was applied at flowering to several varieties showed considerable differences in susceptibility, Dixieland, Dunlop, Earlidawn, Redglow, Robinson and Stelemaster being apparently more susceptible than Armore, Blakemore, Catskill, Fairfax, Jerseybelle, Premier, Pocahontas, Red Star, Sparkle, Starkrimson, Surecrop and Tennessee Beauty. - D.M.L.S. [O.W.]

1940. HOLM, L., GILBERT, F. and HALTVICK, E. (Univ.Wisconsin,Madison,Wisconsin,U.S.A.) The response of strawberries and weeds to the triazine herbicides. Proc.Joint Meet.16th N.Cent. & 10th West.Canad.Weed Control Conf., 1959, 44-5.

The results of trials with variety Sparkle on a sandy loam are given very briefly. Simazine 2 ℔ applied in late May reduced the number of runners (planted August) and the number of rooted runners in September and

October. Simazine 1 and 2 # and trietazine 4 # applied in late May and mid-July (?to runner beds) caused serious yield reductions the following year, and simazine 0.5 # applied 3 times (late May-late August) caused slight reductions. Ipazine, atrazine and propazine 1 and 2 # applied in late May caused severe injury between July and August (? to first year plants). Ipazine gave poor weed control. Simazine 0.125-0.5 + 2,4-DES 2 and 4 # applied at 2 or 4 weekly intervals or twice in May and July reduced rooting by 20% and gave poor grass control. Karsil (N-(3,4-dichlorophenyl)-2-methyl pentanamide) 3 # applied in May was slightly more toxic; it gave good initial weed control, but none by late August. When applied in mid-August, atrazine 0.5 and 1 # and amiben and Karsil 2 and 4 # gave excellent weed control without visible injury that year. It is concluded that simazine at low rates, atrazine in late season, and trietazine, Karsil, and amiben all seem promising. - D.M.L.S. [O.W.]

1941. MULDER, A. (Rijkslandbouwconsulentschap voor Plantenziekten, Wageningen, Netherlands). Bestrijding van onkruiden in boomgaarden met chemische middelen. [Control of weeds in orchards with chemicals.] Fruitteelt, 1960, 50, 188, 189

Practical recommendations are given. For controlling annual weeds on weed-free ground, 1-3 kg simazine in 1000 l water/ha is recommended; for weeds with < 3-4 true leaves, 30 l PCP in oil in 200-800 l spray/ha and for tall weeds, 300-600 l non-selective oil/ha, depending on the size of the weeds. For controlling Agropyron repens, applications of 5 kg dalapon/ha in 1000 l spray volume in early March, or April at latest, followed by a repeat application in September, can be used. Dalapon should not be applied to trees < 5 years old; apples and pears are resistant, but stone fruits are sensitive. - P.J.B. [E.Mall.]

1942. SCHMADLACK, J., VOLKEL, H. and ZAHN, F.P. (Inst.Gartenbau, Dresden-Pillnitz, Germany). Die chemische Unkrautbekämpfung in Baumschulkulturen. [Chemical weed control in fruit tree nurseries.] Dtsch.Gartenbau, 1960, (5), pp.4, figs.2, tabs.1, bibl.3.

A mixture of DNOC + PCP was effective against dicotyledonous weeds, with no subsequent damage to fruit trees. Amitrole applied pre-em. controlled both mono- and dicotyledonous weeds. Both should be applied in 1000 l of water - 3.5 kg/ha for stone fruit, and 2-3 kg/ha for ornamental trees and roses. Grafted varieties are more resistant to herbicidal injury than common. Simazine is similar to amitrole in its effects. The importance of cultivation as an adjunct to chemical treatment is emphasised. - P.C. [237(43)]

1943. LEEFE, J.S. (Kentville Res.Sta., Nova Scotia, Canada). Vegetation control around young apple trees. Proc.Joint Meet. 16th N.Cent. & 10th West.Canad.Weed Control Conf., 1959, 44, tabs.1.

Chemical treatments were applied once yearly at apple bloom for 4 years to 2-year-old Secor trees on Malling I rootstock. Hoeing was done 4 times per season. Amitrole 5 and 10 # gave fair control of couch [Agropyron repens] and almost complete control of other vegetation and resulted in better apple growth than from mechanical hoeing, but not so good as that given by hand hoeing. Dalapon 7.4 and 14.8 # + 2,4-D 1 # failed to control broadleaved weeds and significantly reduced apple growth compared with both mechanical and hand hoeing. The hand-hoed apple trees made significantly better growth than those mechanically hoed. - D.M.L.S. [O.W.]

1944. UNITED STATES. (Washington Agric. Exp.Sta., U.S.A.) Weed control in strawberries for western Washington. Ext.Misc. Publ.Washington agric.Exp.Sta., 1960, 11, pp.5.

Brief recommendations are given for the use of simazine and 2,4-DES for controlling annual weeds. - P.J.B. [48(70.7)]

1945. COSMO, I. and PIERI, G. Diserbo chimico dei vigneti. [Chemical weed control in vineyards.] Riv.Vitic.Enol., 1960, 13, 53-6, bibl.14.

Weedazol [amitrole 50%], applied first at 6 kg/ha and later at 7.5 kg/ha, kept the soil clear of most weeds for 2-3 months and severely checked the more resistant weeds, such as grasses and Plantago major. Karmex W (monuron) at 6 kg/ha gave poor control of all the weeds present. Telvar DW (diuron) was active against all the weeds when applied at 7.5 kg/ha. The vines were damaged severely by amitrole, but the other 2 herbicides affected only the leaves. - Hort.Abstr., 1960, 30,3652.

1946. McCARTY, C.D., DAY, B.E. and RUSSELL, R.C. (Agric.Ext.Serv., Univ. Calif., Riverside, Calif., U.S.A.) Effect of monuron on lemon fruit quality. Calif. Citrogr., 1960, (April), 1, tabs.1.
Monuron applied to lemon trees on light dry sandy soils in California has reduced the size and quality of the fruit. On heavier soils, monuron 2 # has shown no significant effect on fruit quality after twice yearly application for 3 years. Weed control by monuron, fuel oil, or cultivation was equally ineffective on the fruit. - P.C. [180(79.4)]

1947. * VILLASENOR LUQUE, A. Control de malezas en el cafetal. [Control of weeds in coffee.] Cafe (Mexico), 1959, 3,28-9.

1948. HOVIND, H.J. (Wisconsin Conserv. Dep., Tomahawk, Wisconsin, U.S.A.) The role of herbicides in establishing coniferous plantations. Proc.Joint Meet. 16th N.Cent. & 10th West.Canad.Weed Control Conf., 1959, 42, tabs.1.
The results are given of a trial in which simazine 1.5 and 3 #, dalapon 12 #, simazine 1.5 + dalapon 7.5 #, dalapon 7.5 + amitrole 3 # and amitrole 4.5 # were applied at planting (in 1 operation) and were compared with plough furrowing, the crop tree being 2-year-old seedlings of red pine. Amitrole appeared to be the least injurious to the pines, followed by simazine and dalapon. Dalapon 7.5 # had little effect but 12 # caused toxicity symptoms. Grass control from simazine lasted longest and persisted for most of the first growing season.
On all plots Agropyron repens recovered completely by the middle of the second season. It was concluded that both a quick-killing and long-lasting residual effect is desirable and a mixture of dalapon 6 # + simazine 6 # is being tried. - D.M.L.S. [O.W.]

1949. BAGLEY, W.T. and MIYOSHI, R.T. (Nebraska Agric.Exp. Sta., Lincoln, Nebraska, U.S.A.) Chemical weed control in windbreaks. Proc.Joint Meet. 16th N.Cent. & 10th West.Canad.Weed Control Conf., 1959, 43, tabs.1.
In trials with diuron 4 #, simazine 4 # and atrazine 2 # on soils ranging from silty clay loam to sandy loam in a year of high rainfall (1959), survival of 1-2-year-old Juniperus virginiana was reduced by diuron and simazine on a sandy loam. No injury or mortality was suffered by 1-2-year-old Fraxinus pennsylvanica, Ulmus pumila or Eleagnus angustifolia. In new plantings mortality of Pinus nigra, P. sylvestris, P. strobus, P. resinosa and Abies balsamea was considerably increased by the diuron, whereas Picea pungens, Abies concolor, Pseudotsuga menziesii, J. virginiana and Pinus ponderosa were less susceptible; the simazine and atrazine caused much less injury. Weed control from all 3 compounds was adequate throughout the growing season. - D.M.L.S. [O.W.]

BIOLOGY OF WEEDS AND POISONING BY WEEDS

See also 1981,2012.

1950. BORNER, H. (Inst.Pflanzenschutz, Stuttgart-Hohenheim, Germany). Experimentelle Untersuchungen zum Problem der gegenseitigen Beeinflussung von Kulturpflanzen und Unkräutern. [Experiments on the problem of the interaction between crops and weeds.] Biol.Zbl.Leipzig, 1958, 77,(3),310-28.
Research on the interaction of oats and charlock [Sinapis arvensis] grown in alternating rows under glass, with their chemical requirements supplied in aqueous solution, showed that so many ecological factors influenced their growth, that no positive conclusions could be drawn as to their inter-dependence. No statistically significant difference could be assessed in uptake of nutrients or growth. - P.C. [241(43)]

1951. BAKSHI, T.S. and COUPLAND, R.T. (Univ. Saskatchewan, Saskatoon, Canada). The relationship between morphology and persistence in perennial weeds. Proc.Joint Meet. 16th N.Cent. & 10th West.Canad.Weed Control Conf., 1959, 16.
Euphorbia esula and Linaria vulgaris are considered. - D.M.L.S. [O.W.]

1952. HILBIG, W. (Inst.Systematische Botanik und Pflanzengeographia, Halle-Wittenberg, Germany). Vegetationskundliche Untersuchungen in der mitteldeutschen Ackerlandschaft. II. Die Ackerunkrautgesellschaften im Gebiet zwischen Huy und Hakel. [Vegetation studies in the middle German arable districts. II. Field weed associations in the district between Huy and Hakel.] Wiss.Zeit.Martin Luther Univ., Halle-Wittenburg, 1960, 9,(3),309-32.
Growth associations of certain groups of

annual weeds are noted, with the suggestion that such may be of use as indicating soil-types, and consequently of which of the more deeply-rooted crops, e.g. fruit trees and bushes, may be grown with advantage. - P.C. [238(43)]

1953. * SHKURATENKO, Z.V. and NAZIMOVA, D.I. [The weedy field vegetation of the Nekrasov and "Severni" State farms (Kustanay and Aktyubinsk District).] Moskov. Obshch. Isp. Prirody. B. Otd. Biol., 1959, 64, (3), 75-87, (Russ.e.)
Includes control.

1954. * KOLEVA-SEKUTKOVSKA, M. [Contribution to the knowledge of the parasitic flora in P.R. Macedonia.] Zastita Bilja, 1959, 51, 107-15.

1955. RAMIA, M. Las sabanas de Apure. [The savannahs of Apure.] Minist. Agric. Venezuela, Dir. Invest., 1959, pp. 134.
Contains information on 14 undesirable plants. - Turrialba, 9, (3), 104-5.

1956. PIACENZA, E.E. (Agron. Regional, Rosario, Argentina). La maleza en el sur de Santa Fe. [Weeds in the south of Santa Fe.] Rep. Est. exp. agropec. Pergamino, 1959, 22, (Span.).
The crops most affected by weed competition are maize, linseed, potatoes, peas and poppy, and the worst weeds from the economic standpoint are Chenopodium spp., Amaranthus sp., Sorghum halepense, Wedelia glauca, and Cyperus rotundus. Maize is the crop in which herbicides are most used. It is estimated that in 1954-5, 20% of the maize was sprayed with 2,4-D and 8% of the linseed was sprayed.- D.M.L.S. [G.R.I.]

1957. VICIOSO, C. Estudio monografico sobre el genero Carex en Espana. [Monographic study on the genus Carex in Spain.] Publ. Inst. for. Invest. Minist. Agric. Spain, 1959, 79, pp. 205.
Contains descriptions of the spp. present in Spain, an identification key, and an index of scientific names. - From Herb. Abstr., 30, (3), 1289. - D.M.L.S.

1958. LINDENBEIN, W. and RADEMACHER, B. (Inst. Samenkunde u. Inst. Pflanzenschutz, Stuttgart-Hohenheim, Germany). Avena ludoviciana Dur. - der Winterflughafer. [Avena ludoviciana Dur. - the winter wild oat.] Saatgut-Wirtsch. Faohzeit. Samen u Saaten, 1960, (7), 191-3, tabs. 1, bibl. 19.
A detailed review of the morphological differences between and distinguishing characteristics of various species of wild oat [Avena fatua], with particular reference to A. ludoviciana Dur. Their distribution is also indicated. - P.C. [253(43)]

1959. PARHAM, J.W. (Dep. Agric., Fiji). Botany notes. Navua sedge. Batiki blue grass. Agric. J. Fiji, 1959, 29, (4), 153.
The identification of navua sedge as Cyperus melanospermus (see Weed Abstr., 7, 121) is incorrect; it has now been found to be C. aromaticus.
The correct name for Batiki blue grass is Ischaemum indicum and not I. aristatum. - D.M.L.S. [O.RE.]

1960. RENNEY, A.J. (Univ. British Columbia, Vancouver, Canada). Centaurea spp. infestations in British Columbia. Proc. Joint Meet. 16th N. Cent. & 10th West. Canad. Weed Control Conf., 1959, 18-19.
The spp. recorded are C. repens, C. diffusa, C. maculosa, C. diffusa variants, an unidentified sp. (possibly a hybrid between C. jacea and C. nigra), and 2 garden escapes, C. cyanus and C. montana. The extent of their infestations in British Columbia is described.- D.M.L.S. [O.W.]

1961. SELLECK, G.W. and COUPLAND, R.T. (Univ. Saskatchewan, Saskatoon, Canada). Studies in the life history of absinth in Saskatchewan. Proc. Joint Meet. 16th N. Cent. & 10th West. Canad. Weed Control Conf., 1959, 18.
A brief account of studies during 1956-9 on the life history, ecology, and ability of Artemisia absinthium to compete with brome and other grasses in 3 areas of Saskatchewan. - D.M.L.S. [O.W.]

1962. ZILKE, S. and DERSCHEID, L.A. (S. Dakota State Coll., Brookings, U.S.A.) Effects of environmental factors on thistle seed germination. Proc. Joint Meet. 16th N. Cent. & 10th West. Canad. Weed Control Conf., 1959, 20-1.
The results are given of studies of the effect of temperature, alternating temperature, light, wetting and drying, moisture and gibberellic acid on the germination of of Cirsium arvense and Sonchus arvensis. - D.M.L.S. [O.W.]

1963. INGLE, M. (Purdue Univ., Indiana, U.S.A.) Studies on the growth of Sorghum halepense under controlled conditions and on the physiological responses of plants to 2,2-dichloropropionic acid. Ph.D. Thesis, Purdue Univ., 1960, pp. 118, Microfilm $2.50, Xerox $5.80.

Under long-day (16 hours) conditions vegetative growth of S. halepense was proportional to temperature; under short-day (12 hours) conditions it was proportional to temperature up to 27°C but at 32°C it was severely restricted. Flowering was more abundant in photoperiods of 12 hours or less, but was not confined completely to the shorter photoperiods. Bud sprouting and initial growth, under constant conditions, was proportional to temperature, with the greatest increase occurring between 16°C and 21°C.

Immersion of segments in solutions of dalapon showed that this herbicide had an intrinsic toxicity to the buds in addition to its translocation to the rhizomes where it inhibited sprouting for at least 4 weeks.

Germination of grass seeds was inhibited at 5 x 10^{-3}M while 10^{-2}M was required for inhibition of germination of dicotyledonous species. In general, 10^{-3}M inhibited corn and cucumber root elongation. Dalapon entered the roots and affected growth in about 4 hours. It did not affect O_2 uptake by roots of corn, cucumber or of castor bean endosperm mitochondria. Phosphate esterification was reduced by about 25% by concentrations which inhibit growth.

The inhibitory activity of dalapon could not be reversed to any great extent with pantothenic acid, l-pantoic acid or β-alanine. Of several enzymes tested, only squash glutamic acid decarboxylase was inhibited. - J.W.F.

1964. * KADO, T. [Studies of rush plant (Juncus effusus Linn. var. decipiens Buch.) 5. Relations of tillering time to the speed of tillering sequence.] Proc. Crop. Sci. Soc. Japan, 1959, 28, (1), 113-4, (Jap.e.)

1965. * CHAVAN, A.R. and SARNIS, S.D. On Cuscuta chinensis Lamk. - preliminary observations on parasitism. Sci. & Cult., 1960, 25, (9), 544.

1966. * RACOVITA, A. L'extension de l'orobanche rameuse (Orobanche ramosa L.) dans la culture de tabac en R.P. Roumaine. [The spread of broomrape (Orobanche ramosa) in tobacco crops in Rumania.] Bucharest Inst. de Cercet. Aliment. Lucrarile, 1959, 4, 209-14, (Rumanian, f.)

1967. PETERS, R. and HALL, R.J. (Univ. Cambridge, England). Fluorine compounds in nature: the distribution of carbon-fluorine compounds in some species of Dichapetalum. Nature, Lond., 1960, 187, (4737), 573-5, figs. 1, tabs. 1, bibl. 8. [O.W.]

1968. ZIMMER, W.J. Mistletoes of Victoria. For. tech. Pap. For. Comm. Victoria, 1959, (2), 21-2.

The more common host species of the following mistletoes are listed: Nothothixis subaureus, Amyema preissii, A. linophylla, A. quandang, A. miraculosa, A. pendula, A. miquelii, Dendrophthoe curvata, Lysiana exocarpi, Phrygilanthus eucalyptifolius, P. celastroides, and Korthalsella opuntia. - J.W.F. [O.F.]

1969. * LEAPHART, C.D. Dwarfmistletoe [Arceuthobium pusillum] surveys and research to date. Proc. West. Forestry & Conserv. Ass., 1958, 49, 35-6.

1970. REDISKE, J.H. and SHEA, K.R. (For. Res. Centre, Weyerhauser Co., Centralia, Washington, U.S.A.) Host-parasite relationships in photosynthate translocation between dwarfmistle and lodgepole pine. Plant Physiol. (Suppl.), 1960, 35, iii.

A study was made of the host-parasite relationship of dwarf mistletoe (Arceuthobium americanum) growing on lodgepole pine (Pinus contorta var. latifolia) seedlings using $C^{14}O_2$. Selective administration of the $C^{14}O_2$ for 24 hour experimental periods in a controlled environment chamber demonstrated that dwarf mistletoe carried on photosynthesis comparable to a cluster of pine needles. The primary product of photosynthesis for both pine and dwarf mistletoe, as determined by paper chromatography, appeared to be sucrose. The carbohydrates manufactured by dwarf mistletoe were translocated up and down the stem of the pine as shown by autoradiography and analysis; whereas, the carbohydrates produced by a terminal cluster of pine needles were translocated downward in the phloem in a direct line to the roots.

The principal damaging effect of the dwarf mistletoe seems to be the inhibition of downward translocation of photosynthate to

the roots. The dwarf mistletoe acts as a biological girdle resulting in an accumulation of photosynthate above the site of infection. Presumably carbohydrates can be withheld from the roots in quantities sufficient to cause the characteristic decline of the tree that is associated with severe attack by dwarf mistletoe. - [O.W.]

1971. SAPANKEVICH, P.V. Ripeness of seeds and duration of their dormancy. Akad.Nauk. SSSR Inst.Lesa Trudy, 1958, 46, 142-7.

1972. SIMON, J., SUND, J.M., WRIGHT, M.J. and DOUGLAS, F.D. Prevention of non-infectious abortion in cattle by weed control and fertilization practices on lowland pastures. J.Amer.vet.med.Ass., 1959, 135, 315-17.
Non-infectious abortions on lowland pastures are associated with the prevalence of weeds. Eradication of the weeds prevented this type of abortion. Ten heifers grazing on weed-free areas all calved normally, whereas 17 grazing on weedy areas aborted. The diagnosis of impending abortions and the relationship of abortion to nitrate content of the weeds is discussed. - From Vet.Bull., 30,(2), 92 (modified). - D.M.L.S.

1973. SCHMITTLE, S.C., RICHEY, D.J. and TUMLIN, J.T. Toxicity of Crotalaria spectabilis seed in poultry. Poult.Sci., 1959, 38, 1244-5.
Ten chicks fed C. spectabilis seed as 1% of the ration died in 4 weeks. In 10 given the seed as 0.1% of the diet, growth was poor and 2 died. The p.m. findings are described. From Vet.Bull., 30,(3),147. - D.M.L.S.

1974. EGLEY, G.H. and ROGERS, B.J. (Purdue Univ.,Lafayette,Indiana,U.S.A.) A study on the toxic material found in cocklebur. Proc. Joint Meet.16th N.Cent. & 10th West.Canad. Weed Control Conf., 1959, 16.
Previous research on the toxic constituents of Xanthium spp. is briefly reviewed. The authors found that the toxicity resided principally in the seed and young seedlings and was greatly reduced in mature parts. Paper chromatography indicated the presence of a phenol (probably hydroquinone), choline, and a third, more toxic unidentified substance, whose properties are described. - D.M.L.S. [O.W.]

1975. SILVERSTONE, F.S. and VICKERY, J.R. Substance in plants of the order Malvale causing pink whites in stored eggs. Poult. Sci., 1959, 38, 1055-70.
Malvalic acid and sterculic acid caused pink whites in eggs after storage for 1-2 weeks, and larger amounts of sterculic acid inhibited laying. Other fatty acids extracted from Malva spp. did not cause pink whites. - From Vet.Bull., 30,(3), 147 (modified). - D.M.L.S.

AQUATIC AND WOODY WEEDS AND THEIR CONTROL

See also 1874, 1999.

1976. HOFSTEDE, A.E. Bestrijding van overmatige waterplantenvegetatie. [Control of excess aquatic vegetation.] Visserij-Nieuws, 1960, 13,(1-2),2-6.
Considerations in the proper balance between aquatic plant life and fish life in fresh-water canals and watercourses are discussed and methods for restoring the balance between plant and fish life are outlined. - P.J.B. [202(492)]

1977. GREAT BRITAIN. Chemical reed control. Pest Technol., 1960, 2,(2), 270-1, figs.3.
3-5 oz of dalapon/22 yards gave control of Phragmites communis, with no regrowth after 2 years. Broadleaved weeds replacing the reeds were then controlled with 2,4,5-TP. A high-volume power sprayer fitted with a 3-nozzle hand lance gave best coverage, and cost of herbicide did not exceed 3/- per 22 yards, using a 300 gal tank. - P.C. [O.W.]

1978. ROLLINGS, C.T. (U.S.Fish & Wildlife Serv.,Bureau of Sport Fisheries,Minneapolis, Minnesota,U.S.A.) Use of herbicides in the improvement of marsh habitat for waterfowl on national wildlife refuges in the North Central States. Proc.Joint Meet.16th N. Cent. & 10th West.Canad.Weed Control Conf., 1959, 41.
Ureabor (monuron 4%, boron trioxide 41.5%) applied on moist soil or to water a few in. deep in August at 872 # gave virtually

complete control of Typha sp., Phragmites communis, Scirpus fluviatilis, S. acutus, Carex spp. and Sparganium eurycarpum for 3 growing seasons. Baron (erbon 30.5%, related compounds 10.8%) 174 # applied in July gave virtually complete kill for at least a year of Typha sp., P. communis, S. fluviatilis, Carex spp., S. validus, Fluminea festucacea, and Salix interior. Amitrole 8 # applied in July to P. communis in water 0-4 in. deep had given complete control 2 years later; 4 # gave nearly complete control.

At 1 year after application to P. communis on semi-dry soil in August, amitrole 6 # gave 75% kill and Amitrol T (amitrole + ammonium thiocyanate) 2, 4 and 6 # gave 98, 100 and 100% kill respectively. No adverse effects were noted on Lemna, Potamogeton or several other duck food plants.

Dalapon 64 # in 13 months reduced by 75% monotype Typha sp. standing in water up to 12 or more in. deep. Lemna, Potamogeton and Polygonum and other duck food plants showed a marked increase in the deeper water plot. Costs are given. - D.M.L.S. [O.W.]

1979. PRUGNIN, J. Rentability of chemical weed control in drainage canals. Bamidgeh, 1959, 11,(1),28-30.

The expense and suitability of clearing coarse vegetation from a drainage canal by chemical means (dalapon and 2,4-D) were compared with the expense and suitability of removing it manually. The chemicals removed the weeds at only 21% of the cost of manual labour, and the results were superior. - Biol.Abstr. (Plant Sci.), 1960, 35,(14),39325.

1980. MASHLAN, J.A. (City Council,Hamilton, New Zealand). Death to oxygen weed Anacharis canadensis). Service, 1960, 4, (4),4-6, figs.1.

Details of growth habit are given. Dragging the weed from infested areas of water was unsatisfactory, due to the size of the areas and the impossibility of removing it all by this method.

One part of Phenite 6% Sodium Arsenite (sodium arsenite 71.5%, inert ingredients 28.5%) mixed with 3 parts of water were sprayed at 80 gal/ac from a boat in a trial run over a small area of infested water. One month after treatment no live weed could be found.

Ninety six ac of the Hamilton Lake were then sprayed from the air, at a height of 3-6 ft above the water, with a solution of 1 part of chemical to 0.5 parts of H_2O. Badly affected areas were sprayed at a rate of 36 gal/ac and other areas at 16 gal/ac. Four months after treatment the weed was completely eradicated. Cost of spraying the lake was £2958, or about £31/ac sprayed. - J.W.F. [O.W.]

1981. RENICHENKO, O.G. [Fauna of the Cystoseira in the Black Sea.] Tr.Inst. Okeanol.Akad.Nauk.SSSR, 1957, 23,185-94. From Biol.Abstr., 35,36978.

1982. UNITED STATES. (Amchem Products Inc., Ambler,Pennsylvania,U.S.A.) Foliar application of chemicals to weed tree species. Tech.Serv. Data Sheet Amchem Prod.Inc., 1960, E-159, pp.8, bibl.41.

Factors concerning the mechanism of absorbtion, translocation and effect of 2,4-D and 2,4,5-T are reviewed. The oil-soluble amines of these chemicals give excellent results when applied to the leaves of woody weeds as emulsions in water. The invert emulsion, however, caused such rapid destruction of foliage that translocation to the roots was insufficient to prevent regeneration.

Application should take place when movement of plant nutrients is downward, i.e. after the leaves are mature.

Tractor-mounted portable mist blowers provide forest control of brush, using 2 # oil soluble amine of 2,4-D and 2,4,5-T in 3-5 gallons of water. Penetration is more rapid and complete if a low pH ester is used, and there is less risk of damage to the conifers. - P.C. [O.W.]

1983. * SIEGEL, W.C. An investigation into the effect of season upon the effectiveness of 4 methods of hardwood control for red pine plantations in lower Michigan. For.Thesis, Michigan State Univ., 1957.

1984. * YAWNEY, H.W. Effects of volume of foliage spray containing 2,4-D and 2,4,5-T on woody brush in central Pennsylvania. For. Thesis, Pennsylvania State Univ., 1957.

1985. PIERPONT, R.L. (Allied Chem.Corp., New York,U.S.A.) Field investigations with Urox and Urab weed killers. Proc.Joint Meet.

16th N.Cent. & 10th West.Canad.Weed Control Conf., 1959, 39-40.

In most areas 100-150 # of Urox 22 (granular monuron trichloroacetate 22%) or equivalent Urox liquid concentrate will give practical unselective weed control for a 5-6 months growing season, but higher rates are necessary for deep-rooted perennials. Excellent control for 2 years has been obtained with 200 # or with 100 # the first year and 60-75 # in the second year.

Urab 22 (granular fenuron trichloroacetate 22%) applied 6-12 in. from the base of brush, or Urab Liquid Concentrate [32.74% a.i.] injected 6 in. deep into the soil at the base of the brush, or diluted 10% with water and applied as a basal spray, eliminated all brush regrowth 5-6 ft high in Tennessee with little damage to herbaceous ground cover. Actual Urab at rates of 16-21 # a.i. have given complete brush control. Urab Liquid Concentrate 4-5 gal/ac gives good control of Typha sp. in drainage ditches especially when applied to mature foliage. In a pink boll worm eradication programme in Florida Urab 22 200 # effectively controlled wild cotton [Gossypium hirsutum]. In row crops Urab appears most promising in asparagus, maize, cotton, onions, potatoes, pineapples and sugar cane. - D.M.L.S. [O.W.]

1986. HILTON, H.G., HAERTL, E.J. and DAVIDSON, J.H. (Dow Chem.Co.,Midland,Michigan, U.S.A.) Preliminary observations on the use of Silvex granules for brush control on rights-of-way. Proc.Joint Meet.16th N.Cent. & 10th West.Canad.Weed Control Conf., 1959, 40-1.

Kuron granules containing 20% Silvex (2,4,5-TP ester)at 100 # compared favourably with 2,4,5-T (ester) (rate not given) when applied before cutting in autumn, but was more effective when applied in spring after cutting. In the latter case stumps under 8 in. diam. showed very little regrowth 7 months later and there were virtually no Sassafras albidum or locust [Robinia sp.] seedlings. - D.M.L.S. [O.W.]

1987. OTTO, F.J. (E.I.du Pont de Nemours & Co.,4 Morris Drive,Niles,Michigan,U.S.A.) Progress report on "Dybar" fenuron weed and brush killer. Proc.Joint Meet.16th N.Cent. & 10th West.Canad.Weed Control Conf., 1959, 38.

Includes the information that where Dybar (25% fenuron) pellets are directly exposed to rainfall, 3-8 in. of precipitation should give virtually complete disintegration. - D.M.L.S. [O.W.]

1988. HERRON, J.W. (Dep.Hort.,Univ., Lexington,Kentucky,U.S.A.) Additional observations on the control of woody plants with pelleted herbicides. Proc.Joint Meet. 16th N.Cent. & 10th West.Canad.Weed Control Conf., 1959, 38-39, tabs.1.

The following information is included: Volunteer pine seedlings 10-12 in. high were present on plots treated 17-18 months earlier with fenuron pellets at 10-18 #; fenuron and a 1:1 mixture of fenuron + 2,3,6-TBA were more effective in controlling mixed hardwoods than 2,3,6-TBA alone which was relatively ineffective.

Sassafras albidum, Fraxinus americana, Juglans nigra, mountain laurel [Kalmia latifolia] and Cornus florida appeared to be the most resistant to fenuron. - D.M.L.S. [O.W.]

1989. GRUNDY, W.M. and BENNETT, J.M. (Ontario Hydro Res.Div.,Toronto,Canada). Aerial application of herbicides for right-of-way brush control. Ontario Hydro Res. News, 1960, 12,(1),13-17, figs.3.

The development of aircraft spraying is reviewed. Helicopters have been found superior to fixed-wing aircraft, owing to their greater manoeverability; 40-50 gal are carried,delivered to 150 ft wide rights-of-way from 2 11 ft booms; and to 100 ft wide rights-of-way from an 18" stub boom. A 1:1 mixture of low volatile esters of 2,4-D and 2,4,5-T at 4 # in 7 gal spray gives adequate control of deciduous brush; for conifers TCA 26 # in 7 gal is necessary, using diesel oil as the diluent; or water in areas where transport of oil is difficult. Spraying is carried out from a height of about 150 ft at 30-35 m.p.h., and conditions of absolute calm are essential to avoid drift.

The cost is about $22/ac, as against $26/ac for spraying with ground equipment. - P.C. [239(71)]

1990. * MIYAGAWA, S. and SHIMODA, M. (Gov.For.Exp.Sta.,Meguro,Tokyo,Japan). [Investigation on withering broad-leaved trees by using "Ammate".] Bull.Gov. Exp.Sta., 1957, 93,25-32. (Jap.e.)

1991. NELSON, D.W. and STOKES, V.N. Using helicopter to chemically control big sagebrush and Wyethia on the Beaverhead National Forest, 1959. U.S.Dep.Agric. For.Serv., 1960, pp.12.

A detailed analysis of the cost of

spraying 2,4-D by helicopter onto Artemisia tridentata and Wyethia amplexicaulis in the Beaverhead National Forest. - M.L.L. [12(78,6)]

1992. AASTON, M. (Dep.Agric.,Regina, Saskachewan,Canada). Control of woody plants in pastures and rangeland. Proc. Joint.Meet.16th N.Cent. & 10th West.Canad. Weed Control Conf., 1959, 5-7.
A general account, without mention of spp., of mechanical, burning and spraying methods used for brush clearance in the Parkland Area of the Western Canadian provinces. Costs are given. - D.M.L.S. [O.W.]

1993. HEATH, R.G. (Dep.Conserv.,Lansing, Michigan,U.S.A.) Chemical site preparation and maintenance for corn and shrub plantings to improve wildlife habitat. Proc. Joint Meet.16th N.Cent. & 10th West.Canad. Weed Control Conf., 1959, 42-3.
Simazine 2 and 4 # applied pre-em. to cultivated ground resulted in maize yields equal to mechanical cultivation; 5 # applied to Agropyron repens produced maize where previously cultural methods had failed. High maize yields/stem (sowing was somewhat erratic) were produced by (1) burning trash in early spring, (2) spraying simazine 3 # within 3 days of burning, and (3) drilling maize into the dead sod at normal sowing time. Limited observation indicates that burning may not be necessary if the simazine is applied in very early spring (late March or early April).
First-year growth of honeysuckle, multiflora rose, and silky dogwood planted in cultivated soil treated pre-planting with simazine 2 # was equal to growth of plants receiving cultivation. Simazine 4 # applied in mid-May to a complex of A. repens and Poa pratensis gave good control the next year (though no visible effect during the summer it was applied) when applied as granular (8%), but had no effect in either year when applied as a spray.
Established lucerne and Asclepias syriaca seem highly resistant to simazine. - D.M.L.S. [O.W.]

1994. * STERRY, J.R. Weed control in railway tracks. Brit.West Indies Sugar Ass., Proc.Meet.Sug.Technol., 1957, 96-9.

1995. JOHNSON, R.R. (Amchem Prod.Inc., Ambler,Pennsylvania,U.S.A.) Railroad and industrial weed control using amitrol with several standard residual herbicides. Proc. Joint Meet.16th N.Cent. & 10th West.Canad. Weed Control Conf., 1959, 37-8.
Some results are given of trials with mixtures of amitrole with monuron, simazine, and diuron. The mixtures with monuron or diuron are recommended where perennial grasses are a problem, and amitrole + simazine for sites near valuable trees or shrubs. They should be applied when weeds are young. - D.M.L.S. [O.W.]

1996. PIERPONT, R.L. (Allied Chem.Corp., New York,U.S.A.) Industrial weed control with HCA in combination with other herbicides. Proc. Joint Meet.16th N.Cent. & 10th West.Canad.Weed Control Conf., 1959, 40, tabs.2,bibl.1.
Both the initial and residual non-selective weed control effects of the butoxyethanol esters of 2,4-D and 2,4,5-T, separately and in 1:1 mixtures at 6 # and of PCP 10 # and Telvar W (monuron 80%) 6.25 # were improved by the addition of HCA (hexachloroacetone) 2 gal/ac, applied in kerosene at a total volume of 150 gal/ac.
Excellent non-selective weed control was also obtained when Falone (3Y9 10%) 10 #, Randox (CDAA) 4 #, simazine 3 # and Baron (erbon 30.5% + 10.8% related compounds) 12 # were similarly applied with HCA 2 gal/ac at a total volume rate of 150 gal/ac, although results were poor in each case when the compounds were applied alone in water at 150 gal/ac. - D.M.L.S. [O.W.]

OTHER WEEDS AND THEIR CONTROL

See also 1874, 1878, 1885, 1886, 1889, 1891, 1893, 1898, 1905, 1906, 1915, 1916, 1928, 1940, 2089.

1997. SELLECK, G.W. (Saskatoon Univ.,Canada). Perennial weeds, cultural and chemical control. Proc.Joint Meet.16th N.Cent. & 10th West.Canad. Weed Control Conf., 1959, 9-10.
A brief review with mention of recommendations and promising herbicides. - D.M.L.S. [O.W.]

1998. VILLAR, A.D. (Summarizer). (Est.Exp. Oliveros,Prov.Buenos Aires,Argentina). Control de determinadas malezas perennes, anuales y toxicas. [Control of specified perennial,

annual and toxic weeds.] Rep.Est.exp.agropec. Pergamino, 1959, 44-56, (Span.)
The biology, methods of spread, distribution and importance of 22 of the worst weeds in Argentina are discussed and methods of control reviewed. The weeds [those marked * have been declared noxious], with some results obtained, include:- Artemisia verlotorum* - 2,4-D (ester) 3.2 kg/ha alone has given 60% control, and + 2,4,5-T (ester) 4 l/ha (commercial product) 70% control; monuron 10-11.2 kg/ha has given 85-100% control. Wedelia glauca* - (can be toxic to cattle and horses at the herbaceous stage or when dry and to pigs in the seeding stage, but not apparently to sheep). The recommended treatment is to plough in late spring, and apply 2,4-D (ester) 0.64 kg/ha about a month later when 50% of the regrowth is beginning to flower, then repeat the whole process about 20-30 days later, again applying the 2,4-D under the same conditions. This will give 90-95% control. For elimination another ploughing and application of 2,4-D is necessary late in the following spring. Ambrosia tenuifolia [Franseria tenuifolia] - moderately resistant to 2,4-D, the ester applied at 0.64-0.96 kg/ha applied to young plants, and a mixture of the ester at 1.28 kg/ha + 2,4,5-T (ester) 1 l/ha (commercial product) applied to plants 15 cm high have controlled the aerial parts but failed to kill the rhizomes. When eaten by cattle it causes a taint in milk. Datura ferox, abundant in maize, is only partially controlled by 2,4-D (ester) 0.32 kg/ha; 0.4-0.45 kg/ha is recommended. Xanthium cavanillesii* is controlled by 2,4-D (ester) 0.48-6 kg/ha when 15-20 cm high. Its seeds, when germinating, are toxic to pigs. Centaurea calcitrapa, C. solstitialis and C. melitensis are controlled by 2,4-D (ester) 0.32-0.64 kg/ha up to the rosette stage. Salsola kali var. tragus* and Kochia scoparia* are both controlled by 2,4-D (ester) 0.32 kg/ha when 5-20 cm high. Melilotus indicus is sensitive to 2,4-D when young. The following are toxic to stock:- Baccharis coridifolia (controlled by 2,4-D 0.6-0.8 kg/ha), Cestrum parquii (2,4-D and 2,4,5-T will in general only control the aerial parts, but 95% control has been obtained by 2 spring applications of 2,4,5-T 3% applied to new growth); Solanum glaucum and S. sisymbriifolium, perennials with rhizomes, are both resistant to 2,4-D and 2,4,5-T. - D.M.L.S. [G.R.I.]

1999. UNITED STATES. (Amchem Prod.Inc., Res.Dep., Ambler, Pennsylvania, U.S.A.) Progress report on Weedazol TL. Amchem Prod.Inc., Tech.Serv.Data Sheet, 1960, E-161, pp.10, tabs.10, bibl.19.
A comparison between amitrole and Amitrol T is made, based on reports of trials from a number of states. Reports indicate the general superiority of Amitrol T over amitrole for Agropyron repens and other grasses; also for Equisetum spp., Canada thistle [Cirsium arvense] and, in general, broadleaved weeds show little difference in response at either 2 or 4 %. Aquatic weeds showed similar responses to both herbicides, Lemna and Potamogeton spp. being unaffected, with Eichhornia spp. showing fair response. - P.C. [O.W.]

2000. AANESTAD, A.M. (E.I.du Pont de Nemours & Co., 1207 Foshay Tower, Minneapolis, Minnesota, U.S.A.) Progress report benzoic acid weed killers. Proc.Joint Meet.16th N. Cent. & 10th West.Canad.Weed Control Conf., 1959, 35.
Includes the information that, during the last 2 years, chlorobenzoic acid compounds 2-5 # applied in early spring have shown promise for control of wild garlic [Allium vineale], blueweed [Helianthus ciliaris] bouncingbet [Saponaria officinalis], phragmites [Phragmites communis], silver nightshade [Solanum elaeagnifolium], yellow starthistle [Centaurea solstitialis], and Russian thistle [Salsola kali.] - J.W.F. [O.W.]

2001. GODOY, E.G. (Coordinator). (Est. Exp.Pergamino, Prov.Buenos Aires, Argentina). Uso de los herbicidas selectivos en el control de las malezas del lino, cereales menores, maiz y campos de pastoreo. [Use of selective herbicides for weed control in flax, small grain cereals, maize and pasture.] Rep.Est.exp.agropec.Pergamino, 1959, 31-44.
The commonest weeds in flax (or linseed), wheat, maize, rice and sorghum respectively in Argentina are listed and recommendations for control given. These include 320 g/ha of 2,4-D (ester) for Verbesina ensilioides and Proboscidea lutea, 370-555 g/ha for Rapistrum rugosum, Ammi majus, and Carduus acanthoides, 480 g/ha for Sagittaria montevidensis, 740 g/ha for Lithospermum arvense, and Diplotaxis tenuifolia. Cynara cardunculus requires too high a rate

of 2,4-D for use in wheat. Mixtures of MCPA and 2,4-D at 7:3 and 1:1 have given good provisional results against Polygonum convolvulus. - D.M.L.S. [G.R.L.]

2002. DEMING, J.M., WILSON, C.L., HAMM, P.C. and D'AMICO, J.J. (Monsanto Chem.Co.,Res.Dep.,St.Louis,Missouri,U.S.A.) Introductory studies of an effective wild oat control chemical. Proc.Joint Meet. 16th N.Cent. & 10th West.Canad.Weed Control Conf., 1959, 49-50, tabs.1.

When Avadex (2,3-dichloroallyl diisopropylthiolcarbamate) was incorporated into the top soil its performance improved 4 to 8 fold compared with surface application. Wild oats [Avena fatua] sprayed when 2 weeks old were controlled by 4 #.

In greenhouse tests, 1 # removed cheat [Bromus secalinus], wild oats, foxtail [Setaria sp.], crabgrass [Digitaria sp.] and barnyard grass [Echinochloa crus galli]; it was active against pigweed [Amaranthus sp.], plantain [Plantago sp.] and ragweed [Ambrosia artemisiifolia]; muskmelon, tomato, sugar beet, lucerne, peas, and turnips were resistant, and cotton and soybeans highly resistant.

More than 4 # injured wheat in the field, and both oats and sorghum were very susceptible to low rates. - J.W.F. [O.W.]

2003. HANNAH, L.H. (Monsanto Chem.Co., Res.Dep.,St.Louis,Missouri,U.S.A.) Avadex, a selective wild oat herbicide. Proc.Joint Meet.16th N.Cent. & 10th West. Canad.Weed Control Conf., 1959, 50.

Based on the results of several years' field testing, a commercial farm programme carried out during 1959, and observations of trials at experiment stations in Canada and the U.S.A., the following conclusions regarding Avadex (2,3-dichloroallyl diisopropylthiolcarbamate) were made: (1) 1.5 # gave excellent control of wild oats, although 2 # with 2 incorporation treatments were necessary on stubble ground; (2) flax, barley and sugar beet showed adequate tolerances to this rate; (3) increases in crop yields resulted from the use of Avadex; (4) sunflower, peas, rape, and possibly wheat appear to be tolerant to Avadex; (5) using a log. sprayer resulted in approximately 95% control at rates from 1.2 to 1.5 #; (6) proper mixing is essential, although soil type and temperature at the time of application and rainfall following the treatment appeared to have little or no influence on the effectiveness of Avadex; (7) due to a rather long soil life, Avadex is able to control wild oats through a germination period of 6 to 8 weeks, and reworking areas for periods up to 33 days after treatment did not destroy its effectiveness. - J.W.F. [O.W.]

2004. HAGOOD, E.S. (Niagara Chem.Div., Res. & Dev.Dep.,Middleport,New York State, U.S.A.) An evaluation of 2,6-dichlorobenzonitrile as a control of wild oats and other species. Proc.Joint Meet.16th N.Cent. & 10th West.Canad.Weed Control Conf., 1959, 36,37.

2,6-Dichlorobenzonitrile (DBN) at 4 # gave 98.1% control of Avena fatua in 1 trial, and in another A. fatua sown 2-6 in. deep was controlled 91.5-100% by DBN 2, 3 and 4 # without regard to depth of sowing. DBN 4 # reduced wild oat germination by only 9.1%, but only 0.05% of germinated plants emerged compared with 52.3% of untreated germinated plants. The shoots were killed when they entered the upper 1.5 in. soil layer into which the compound had been incorporated.

DBN 1 # was comparable with EPTC 6 # for overall weed control; propham 6 # and dalapon 8 # were markedly less effective than DBN at 1 and 4 #. DBN was more effective against A.fatua when applied pre-sowing and incorporated than pre-em., but even so it was more effective pre-em. than simazine 2 # or diuron 3 #. DBN 4 # pre-em. gave the following control %: Echinochloa crus galli 79, Digitaria sp. 89, Setaria sp. 98, A. fatua 85, Chenopodium album 98, Brassica sp. 87, Amaranthus sp. 99 and Portulaca oleracea 88. - D.M.L.S. [O.W.]

2005. FRYER, J.D. (A.R.C.Weed Res.Organisation, Dep.Agric.,Univ.Oxford,England). Couch control with dalapon. Min.Agric.Fish.Fd N.A.A.S. Advisory Serv.Branch, 1959, A.S.H.6037, pp.2.

The effectiveness of dalapon 15 # a.e. for control of Agropyron repens can be increased by (a) ploughing 8 in. deep 2 weeks after spraying, followed by a smother crop such as kale; (b) breaking up the root system by cultivation to stimulate dormant buds to produce foliage before spraying. Spraying may be carried out at any time of the year provided the weed is growing actively. An interval of several weeks should elapse between spraying and sowing, due to the persistance of dalapon in the soil. Dalapon can be used in a large range of perennial crops; where crops are not strongly tolerant, repeated, very low doses of dalapon can climinate A. repens. - M.E.L. [423(42)]

2006. CORNS, W.G. (Univ.Alberta,Edmonton, Canada). Chemical control of couch grass. Proc.Joint Meet.16th N.Cent. & 10th West. Canad.Weed Control Conf., 1959, 34.

In trials during 3 years in which plots were cultivated either immediately before or at 2 weeks after chemical treatment + further cultivations when necessary, amitrole 15, 30 and 60 # failed to prevent couch [Agropyron repens] regrowth even with 4 cultivations after treatment. Dalapon 50 # gave good top kill but was much less effective than TCA in controlling regrowth; when treatments were followed by 1 cultivation in summer and 1 before sowing in the following spring, regrowth after 2 years was more than 90% of controls on the dalapon 50 # plots, compared with less than 5% on the TCA 60 # plots. Foliage applications of TCA followed by 1 cultivation 2 weeks later were as effective as TCA applied to the soil after cultivation. There was temporary inhibition of lawn grass and thinning of the stand in some of the plots seeded within 6 weeks after TCA and dalapon application but grass seeded the following spring grew normally.

Preliminary results of another trial confirmed the good results with TCA foliage sprays followed by 1 cultivation, but in untilled areas regrowth was not controlled by foliage sprays of TCA 50 and 100 #, or of fenac or cacodylic acid at 5, 15 and 30 #. When plots were tilled after treatment fenac at 15 and 30 # prevented annual weed growth as well as virtually all couch regrowth, but cacodylic acid still failed to control couch regrowth. Fenac showed no promise of selectivity when sprayed on couch, creeping red fescue and Kentucky bluegrass. - D.M.L.S. [O.W.]

2007. * von HOFSTEN, C.G. [Chemical control of couchgrass.] Maskintek.i Jord och Skog, 1959, 11,(4),205-8, (Sw.)

2008. DERSCHEID, L.A. (S.Dakota State Coll., Brookings,U.S.A.) Methods of controlling Canada thistle. Proc.Joint Meet.16th N.Cent. and 10th W.Canad.Weed Control Conf., 1959, 23-4.

Methods considered included: cultivation, and by spraying in (1) cereals, (2) forage crops and (3) fallow, rates of application are given for 9 soil sterilants. - D.M.L.S. [O.W.]

2009. SELLECK, G.W. (Univ.Saskatchewan, Saskatoon,Canada). Chemical and cultural control of absinth. Proc.Joint Meet.16th N.Cent. & 10th West.Canad.Weed Control Conf., 1959, 34-5, tabs.1.

Absinth [Artemisia absinthium] causes a taint in dairy products when eaten by milch cows, and harvested cereal grain which is only slightly infested is graded "rejected". Good cultural practices will control it in cultivated areas. In trials over 3 years the following gave 100% control when applied once at 14 # or twice in the same season at 4 #: 2,3,6-TBA, amitrole and 2,4-D (mixed esters), and the following when applied once per season for 2 successive years: 2,4-D mixed esters 1-1.5 #, butoxy ethanol ester 1 #, and mixed amines 2.4 #, MCPA butyl ester 2.1 #, 2,4,5-T ester 1.6-2.1#,2,4-D + 2,4,5-T esters 0.5-1.5 #, erbon 8 #, and CP 1815 (mixture of chlorinated benzoic and cresoxy acetic acids) 1.4 #. In the case of 2,4-D mixed esters, better results were obtained from initial spraying in late August than from spraying in May-July provided regrowth was sprayed in the following spring. Borax 1000 # also gave 100% control and borax + 2,4-D mixture at 500 # 90-95% control. - D.M.L.S. [O.W.]

2010. * RUDENKO, A. and RUDAKOV, O. [Biological control of Cuscuta.] Selsk. Khoz.Kirgizii, (n.d.), (11),27-28, (Russ.)

2011. COEY, W.E. and PATTERSON, J.T. Weed control. Rep.Agric.Res.Inst.N.Ire. 1958-59, 1959, 36.

Applications of 2,4,5-T in late March or June for the control of gorse [Ulex europaeus] were more effective than those in early March or September, and 12 or 16 lb/100 gal more effective than 4 or 8 lb/100 gal. Oil solutions were better than water. - D.M.L.S. [G.R.I.]

2012. TUCKER, J.M., CORDY, D.R. and BERRY, L.J. (Calif.Agric.Exp.Sta.,Davis, California,U.S.A.) Poisonous larkspurs - identification and control. Bull.Calif. agric.Exp.Sta., 1960, pp.4, figs.6.

Low larkspur [Delphinium parishii] may be controlled by means of 2 # 2,4-D low volatile ester applied from time of emergence to the low-rosette stage. - P.C. [181(79.4)]

2013. SCHMIDT, O. Simazin-Granulat als Hilfsmittel zur Franzosenkrautbekämpfung. [Simazine granular as an aid to control of gallant soldier.] Die Zuckerrübe, 1960,

(4), pp.2, tabs.7, bibl.7.
In a series of experiments during 3 years simazine gave adequate control of Galinsoga parviflora. As a spray 0.75 kg/ha, the weed weight was reduced to about one seventh of that on control plots, but there was some damage to the beet, and reduced sugar percentage. The granular formulation at 0.8 kg/ha active principle proved safer, giving comparable weed control when applied after the last cultivation, without damage to the crop. - P.C.
[246(43)]

2014. JOHNSTON, A. and PEAKE, R.W. (Agric.Res.Sta., Lethbridge, Alberta, Canada). Effect of selective grazing by sheep on the control of leafy spurge (Euphorbia esula L.). J.Range Mgmt, 1960, 13, (4), 192-5, figs.1, tabs.2, bibl.7.
A good stand of crested wheatgrass (Agropyron cristatum) well mixed with E. esula was grazed by sheep for 5 years. There was a 98% decrease in E. esula, and it should therefore be mown, prior to grazing. - P.C. [O.W.]

2015. BACHTHALER, G. (Bayer.Landesanstalt für Pflanzenbau und Pflanzenschütz, Munich, Germany). Feldversuche zur chemischen Bekämpfung der Echten Kamille (Matricaria chamomilla) in Wintergetreide. [Field experiments on chemical control of wild chamomile in winter corn.] Prakt.Bl.Pflanzenbau., 1959, 54, (4), 117-25, tabs.9.
Experiments conducted at the Bavarian Institute for Plant Culture and Protection have shown that DNOC is the best herbicide for the control of M. chamomilla. It was slightly superior to "Pesco" (MCPA + 2,3,6-TBA). The herbicidal effect of calcium cyanamide is cancelled out by its subsequent effect as a fertilizer. A dose of 6 kg/ha DNOC sprayed on winter corn early in May, is found effective, and superior to mecoprop or MCPA (ester). - P.C.
[236(43)]

2016. OKA, H.-I. and CHANG, W.-T. The impact of cultivation on populations of wild rice, Oryza sativa & f. spontanea. Phyton, Vicente Lopez, 1959, 13, 105-17.
Studies were made at Taichung, Formosa of the following populations from Raipur, Madhya Pradesh: (I) O. sativa f. spontanea growing in swampy land; (II) O. sativa f. spontanea growing amongst grass between two rice fields; (III) O. sativa f. spontanea growing as a weed in a rice field; (IV) the cultivated variety in which the preceding population was found; and (V) O. perennis growing in a reservoir. On the basis of a scoring system involving 100-grain weight, panicle length, ligule length, length/width ratio of the grains, apiculus hair length and rachis number/panicle, populations (I) to (IV) were found to form a continuous series from truly wild to cultivated; presence of awns and heading date were also related to degree of wildness in these populations. Population (V) remained outside the array. Populations (II) and (III) contained a number of plants with semisterile pollen and gave higher estimates of heterogeneity and heterozygosity than (I) and (IV). Also, (II) and (III) were intermediate between (I) and (IV) in degree of outcrossing, grain shedding and dormancy. Population (V) differed from all the others in its heterogeneity and heterozygosity, its greater amount of outcrossing, pollen sterility and shedding and its longer dormancy period. It is concluded that the continuous variation found in populations (I) to (IV) is due to introgressive hybridization between wild and cultivated forms and subsequent selection under varying intensities of cultivation pressure. - Plant Breed.Abstr., 30, (3), 2706.

2017. MORTON, H.L., HAAS, R.H. and ERICKSON, L.L. (Agric.Exp.Sta., Moscow, Idaho, U.S.A.) Halogeton and its control. Bull. Idaho agric.Exp.Sta., 1959, 307, pp.24, figs.5, tabs.6, bibl.18.
The problem of the spread of halogeton [Halogeton glomeratus] is stated, and its geographical limits defined. It has caused severe losses of sheep in many districts in the 10.5 million ac infested in the western States, mainly alkaline or saline, with low rainfall and great temperature range. The active principle is oxalate in the leaves, which decreases with leaf drop.
Of post-emergence herbicides 2,4-D proved most consistently successful, in ester formulation, 2 # at the cruciform stage giving 100% kill. Time of application was a vital factor as halogeton develops a tolerance to 2,4-D as the season advances, maximum kill being achieved during June with 2 # of low-volatile ester 2,4-D in 10-15 gal water as the optimum. In re-seeding programmes, the grass seedlings proved resistant to 2,4-D.
Later work using dormant or pre-em. herbicides in the autumn or early winter has shown encouraging results with 2,3,6-TBA, 2,4,5-TP and diuron.
Soil sterilants (monuron, potassium chlorate) have not proved satisfactory, owing to their high cost, and to the fact that their

persistence interferes with re-seeding programmes. - P C. [15(79.6)]

2018. AUSTRALIA. Sorghum almum. Herb. Abstr., 1960, 30, (3), 238.
(Reference Weed Abstr., 9, (5), 878). The ban on the sale of S. almum seed has not been lifted in Queensland, where it is still banned on the grounds of its high hydrocyanic acid content, the possibility of it becoming a weed, and the danger of potential weeds arising from crosses between S. almum and S. halepense. - D.M.L.S. [O.W.]

2019. * RATERA, E.L. Consideraciones generales sobre el "sorgo de Alepo", Sorghum halepense (L.), Pers. [General considerations concerning "sorgo de Alepo", Sorghum halepense (L.).] Soc. Argentina de Hort. B., 1959, 17, (116), 165-9.

2020. TIPPANNAVAR, M.B., HIREGOUDAR, S.V. and ARAKERI, H.R. (Sugar Cane Res. Sta., Mandya, India). Eradication of nut-grass (Cyperus rotundus). Mysore agric. J., 1959, 34, (3/4), 122-6, tabs. 1, bibl. 6.
Two applications of 2,4-D (sodium) 80% a.i. 1.5-1.75 and 2 lb following ploughing, irrigation and harrowing of sugar cane land, with an interval of 15 days between the applications, reduced C. rotundus by ca. 89-94% and gave about 20% more control than 1 spraying. The higher rates made little difference. - D.M.L.S. [M.D.H.]

2021. SIVORI, E. Generalidades sobre malezas. Su distribucion geografica en la region pampeana. [Generalities on weeds. Their geographical distribution in the pampas region.] Rep. Est. exp. agropec. Pergamino, 1959, 9-15, (Span.), figs. 1, tabs. 1.
Includes a list of 58 weeds (common and botanical names) with an assessment of their distribution in the northern, central western and southern regions, and in the Salado depression of the pampas. - D.M.L.S. [G.R.I.]

2022. BRIGGILER, H.A., CASARRUBIA, A. and SCHWEGLER, R. (Est. Exp. Rafaela, Prov. Santa Fe, Argentina). El problema del pasto puna (Stipa brachychaeta, Cord.) en el centro de Santa Fe. [The problem of "pasto puna" (S. brachychaeta, Cord.) in central Santa Fe.] Rep. Est. exp. agropec. Pergamino, 1959, 30-31, (Span.)
S. brachychaeta has invaded central Santa Fe from the north and its invasion has increased enormously in recent years. It is most frequent in uncultivated areas and in lucerne. It is a perennial and has 2 types of inflorescence which are described. Methods of spread are discussed. - D.M.L.S. [G.R.I.]

2023. SOLOHAGA, H.G. and VELEZ, J.C. (Direccion Gen. Sanidad Vegetal, Argentina). Aplicacion de 2,4-D para combatir la "morenita" (Kochia scoparia). [Application of 2,4-D to control "morenita" (K. scoparia).] Rep. Est. exp. agropec. Pergamino, 1959, 75, (Span.).
At 30°C, 0.233 kg/ha gave good control of K. scoparia 15 cm high. [G.R.I.]

2024. VELEZ, J.C. (Sanidad Vegetal, Zona Rosario, Argentina). Utilizacion del 2,4-D para combatir cardo comun en cultivos de alfalfa. [Use of 2,4-D for the control of "cardo comun" in lucerne.] Rep. Est. exp. agropec. Pergamino, 1959, 75-6, (Span.).
2,4-D (butyl ester) 0.32 kg/ha killed [Carduus acanthoides] 40 cm high without injuring 4-year-old lucerne, but scorched the aerial parts of 2-year-old lucerne. Lower rates were ineffectual. - D.M.L.S. [G.R.I.]

2025. * PANIGRAHI, B.M. and MISRA, G. Control of the weed Heliotropium indicum with maleic hydrazide. Curr. Sci., 1960, 29, (2), 67-8.

2026. * ELENEV, L.K. Dodders [Cuscuta spp.] of Krasnodar Territory and methods of controlling them. Selsk. Khoz. Sev. Kavkaz, 1959, 12, 70-1.

2027. PRINGLE, W.L. (British Columbia Dep. Agric., Kamloops, Canada). The effect of Trirhabda pilosa, a leaf feeding beetle, on big sagebrush in British Columbia. Proc. Joint Meet. 16th N. Cent. & 10th West. Canad. Weed Control Conf., 1959, 21.
An investigation over 4 years showed that up to 50% of mature Artemisia tridentata may be killed in 1 season. Sage used as aphid pasture by ants survived. Attempts to move beetles to other areas of infestation have so far been unsuccessful; the insect is taxonomically native to the area. Many injured plants recovered, especially immature plants. Proper range management is an essential accompaniment of this method of control. - D.M.L.S. [O.W.]

2028. SCHMIDT, H. (Deutsch.Akad.Landwirtschaft.,Berlin,Germany). Chemische Mittel zur Unkrautbekämpfung. [Chemical means of weed control.] Biol.Zentralanstalt,Berlin, 1960, 21,(2),pp.10.
A classification of, and review of modes of action of, a number of newer herbicides.- P.C. [215(43)]

2029. * TAYLOR, W.C. The chemistry of plant growth substances. Ph.D.Thesis, Manchester Univ.

2030. GARDNER, K. and OVERTON, K.C. (Fisons Pest Control Ltd.,Anal.Dep., Cambridge,England). Analysis of MCPA/TBA herbicide formulations. 1. A liquid-liquid chromatographic method for determination of 2,3,6-trichlorobenzoic acid. Anal.Chim. Acta, 1960, 23,271-81, figs.1,tabs.6, bibl.5.
A description is given of a method for determining the percentage of 2,3,6-TBA in MCPA/2,3,6-TBA mixtures. The system used is isopropyl ether-phosphate buffer. Eluted acid fractions are titrated in non-aqueous solution with sodium methylate solution. The effect of all possible chlorobenzoic acid and methyl chlorophenoxyacetic acid impurities was studied. The method has a precision of about ± 2%. - P.J.B.

2031. PALMER-JONES, T. (Animal Res.Sta., Wallaceville,New Zealand). Effect on honey-bees of some chemical weedkillers. N.Z.J.Agric.Res., 1960, 3,(3),485-90, figs.2,tabs.1,bibl.5.
In tests in the laboratory, in observation hives, and in the field, the butyl and butoxyethanol esters of 2,4,5-T were harmless to honeybees; dinoseb + dinosam and PCP were repellant to bees, and when sprayed on bees, killed them. There was no contamination of unsprayed by sprayed bees in these experiments. - J.W.F. [O.RE.]

2032. ARNDT, F. (Inst.Pflanzenschutz Landwirtschaft.Hochschule, Stuttgart-Hohenheim,Germany). Einfluss verschiedener Eigenschaften des Bodens auf die herbizide Wirkung von Cyclo-octyl-dimethylharnstoff (OMU). [Effects of differing soil types on the herbicidal activity of cyclo-octyl-dimethylurea (OMU).] PflKrankh., 1960, 67,(1),25-30, tabs.3,bibl.6.
The effects on the herbicidal activity of cyclo-octyl-dimethylurea (OMU) of microflora, leaching, adsorption, soil water content and temperature were studied on eight different soil types. Fen soil and others rich in humus held (by adsorption) 5-15 times more OMU than mineral soils, and loams up to 3 times more than pure sands.
Herbicides were most active on soils which adsorbed least.
A significant correlation was shown between the effectiveness of the herbicide and the following soil characteristics: (a) hygroscopicity, (b) its humus content and adsorptive capacity, and (c) cation exchange capacity.
The degree of leaching, differences in pH value, and differences in P_2O_5 and K_2O content, was not significantly correlated with the herbicidal effectiveness of OMU.- P.C. [245(43)]

2033. STANIFORTH, D.W. and LOVELY, W.G. (Iowa State Coll.,Ames,U.S.A.) Comparison of granular and liquid formulations of 2,4-D under various simulated rainfall conditions. Proc.Joint Meet.13th N.Cent. & 10th West. Canad.Weed Control Conf., 1959, 54.
Laboratory trials are described, from which the following conclusions were drawn:-(1) In general there was little difference in the amount of 2,4-D (iso-octyl ester) present on the various sizes of granules within a range of 30-100 mesh in a commercial granular 2,4-D formulation. (2) Bioassay of the filtrates showed that ca. 75% of the iso-octyl ester of 2,4-D was removed from attapulgite and bentonite granules after 12 hours' soaking in water and ca. 25% after 3 hours' soaking; 90% of the 2,4-D parent acid was lost after 3 hours' soaking. (3) Bentonite gave the slowest release of 2,4-D of the clay granules tested, but the difference was too small to have any importance under field conditions. Equal amounts of 2,4-D(ester) released from granules in the centre of petri plates produced complete inhibition of all turnip seedlings in the dish. (4) In 3 trials there was very little difference in the amount of liquid and granular formulated 2,4-D(ester) leached from the soil surface following simulated rainfall of 2 in. over a 12-hour period or in the depth to which it was leached.
With a given type of granule, % of toxicant/unit weight was of no importance in this respect. In general the 2,4-D acid-impregnated granules resulted in deeper movement of 2,4-D into the soil than was obtained with the ester (liquid or granular). - D.M.L.S. [O.W.]

2034. LEME, H. de A., SAAD, O. and MONTEIRO, M.V.de M. Comparacao entre os cultivos manual, mecanizado, motomecanizado e quimico da cana-de-azucar na regiao de Piracicaba. [Comparison of manual, mechanized, motorized and chemical weeding of sugar cane in the Piracicaba area.] Rev.Agric. Piracicaba, 1959, 34,173-81, bibl.4.
Hand-weeding took 9 times as long as using a horse-drawn cultivator, 77 times as long as using tractor-drawn implements, and 118 times as long as spraying herbicides with tractor-drawn apparatus. Under local conditions the horse-drawn cultivator was the least costly to operate, but for a slightly higher cost the use of a tractor was fully justified. Chemical spraying was rather more expensive, but the difference in cost between the 3 methods were small compared with the very high cost of hand-weeding. - Hort.Abstr., 1960, 30,3672.

2035. CHALLEN, S.B. Contribution of surface characters to wettability of leaves. J.Pharm., (Lond.), 1960, 12,307-11.
A technique based on the preparation of carnauba wax positive replicas of leaf surfaces, is described. Macroscopic surface roughness is the chief factor preventing the wetting of Festuca pratensis. The contribution of surface chemistry and surface roughness is discussed also for leaves of Agropyron repens and 2 species of Papaver. - J.Sci.Fd Agric., 1960, 11,(10),ii-156.

2036. WALLIS, J.A.N. (Coffee Res.Sta., Ruiru,Kenya). Observations on the use of certain chemicals to mark herbicides to be used on grass. Pest.Abstr.News Summ.,Sect.C, 1960, 6,(2/3), 52-4, tabs.1.
Uneven application by hand-spray in coffee plantations militates against the usefulness of herbicides against weed patches. Experiments are described in which various dyes were used as markers for assessing visually the amount of herbicide applied. Methylene blue at 10 oz/ac in 60 gal proved the most satisfactory for use with dalapon in controlling couch,persistence being great enough to indicate undersprayed areas for further treatment. - P.C. [O.W.]

2037. ANSDELL, R.C. A laboratory apparatus for the continuous production of uniform droplets. Agric.Vet.Chem., 1960, 1,(3), 139-40, figs.3,bibl.5.
The apparatus described uses a vibrating finger to remove droplets at a uniform rate and of uniform size from a pendant drop of liquid. The droplets are then sprayed in a uniform line on to a moving target bed. - P.J.B. [O.W.]

2038. JOHNSTONE, D.R. (Col.Pest.Res.Unit, Porton Down,Salisbury,Wilts,England). Assessment techniques. 2. Photograph paper. CPRU/Porton/Rep., 1960, 177, pp.13, figs.6, tabs.2,bibl.12. [O.W.]

2039. FENSTER, C.R. (Box Butte Exp.Sta., Alliance,Nebraska,U.S.A.) Selecting tools for better mulch farming. Crops & Soils, 1960, 12,(9),12-13,35, figs.8.
Equipment for stubble mulching (a counter-erosion system designed to keep a sufficient amount of crop residue on the soil surface at all seasons) includes sweep machines, rod weeders with plain rotary rod or with semi-chisels or small shovels, chisel ploughs and one-way or tandem disks. The weed control capabilities of these machines in relation to residue reduction is discussed. - D.M.L.S. [O.W.]

2040. * ISHIHARA, A. [Experimental studies on the vibration of knapsack type mist sprayers.] Soc.Agr.Mach.Japan.J., 1960, 21,(4),149-52, (Jap.e.)

2041. NURSERY, R.C. (Columbus,New Jersey, U.S.A.) Methyl bromide disperser. Tree Planters' Notes, 1959, 37,11, figs.1.
The fumigant is contained in a 1 lb pressurized can equipped with a puncturing device and a 0.25 in. diameter plastic tube; the tube leads into a 1 gal jug which prevents spillage and helps to hold up the seed-bed cover. - J.W.F. [O.F.]

2042. SHUMAN, F.L. (Agric.Engng Dep., Univ.Michigan,U.S.A.) Experimental dust distributor offers less drag and more payload. Agric.Chemic., 1960, 15,(9), 55,103.
A preliminary report is given on a project to develop a blown-driven, positive-energy, dust-distributing system that would be more efficient than traditional ram-air venturi spreaders for agricultural chemicals. The system, when perfected, should have the following advantages: low power requirement, increased pay load, more uniform distribution, increased swath width, reduction of drift, faster application rate, and instantaneous full-flow rate. - J.W.F. [O.W.]

2043. * ISHIHARA, A. Characteristics of atomization nozzles for knapsack type mist sprayer. Tottori Soc.Agric.Sci.Trans., 1960, 12,58-68.

2044. * BEREZOVSKII, M.Ya. Use of aircraft and tractor sprayers for chemical weeding of flax crops. Moskov.Ordena Lenina Selskokhoz.Akad.im.K.A.Timiryazeva Dok. TSKHA, 1958, 39,156-60.

2045. JOHNSTONE, D.R. (Col.Pest.Res.Unit, Porton Down,Salisbury,Wilts,England). Performance of the modified S.A.6 boom and nozzle crop spraying installation fitted to a dragon-fly helicopter. CPRU/Porton/ Rep., 1960, 175, pp.30, figs.16,tabs.3, bibl.14. [O.W.]

2046. WALKER, P.T. (Col.Pest.Res.Unit, Porton Down,Salisbury,Wilts.,England). The characteristics of a commercial hand operated granule distributor, the Cook "Granula", modified for rows of maize. CPRU/Porton/Rep., 1960, 176, pp.7, figs.3, tabs.2,bibl.5. [O.W.]

2047. * VOROBEV, M.K., SAZHIN, F.N. and GALUSHKO, E.D. Stationary equipment for spraying plants in greenhouses. Zashch. Rast.ot Vred.i Bolezned, 1959, 6,23-4.

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See also 1963.

2048. YOKOYAMA, K. and MUNAKATA, K. (Univ.Illinois,Chicago 12,Illinois,U.S.A.) Herbicidal activities of halogenoalkyl-carboxylic acid esters on seedlings. Plant Physiol. (Suppl.), 1960, 35,viii.

The effect of halogenoalkylcarboxylic acid esters upon seed germination (pre-em.) has been reported (Weeds, 7,470-3). The effectiveness of these compounds has now been tested on seedlings (post-em.) and found to be different in some instances. For example allyl chloroacetate and allyl 2,3-dichlorobutyrate were effective seed-killers but were not as toxic to the seedlings at the same concentration. The bromo- and iodoacetates showed selectivity between monocots and dicots. Differences were also evident between types of dicots. Each compound has its own characteristic physiological effect upon the seedlings with respect to colouration, curling of the leaves, growth effect of leaves and stem, and killing of the whole seedlings.

A series of 34 compounds was tested upon seedlings of rape, millet and tomato. Included in the tests were several new compounds synthesized in our laboratory. Other compounds previously reported in the literature but not commercially available were also synthesized and tested for their herbicidal activity. [O.W.]

2049. BURLINGHAM, G.K. (Cornell Univ.,Ithaca, New York State,U.S.A.) A study of the effects of 2,4-dichlorophenoxyacetic acid on the growth and respiratory metabolism of tissue from the red kidney bean plant and of the antagonistic effects of various uncoupling agents toward the growth promoting effects of the auxin substance. Ph.D.Thesis, Cornell Univ., 1960, pp.652, Microfilm $8.25, Xerox $20.50.

The effects of 0.5 p.p.m. 2,4-D on the respiratory metabolism of cultured, decotyledomized red kidney bean embryos and of sections of cultured bean hypocotyl tissue were investigated. Measurements were made of the oxygen consumption, aerobic carbon dioxide evolution, and anaerobic carbon dioxide potential of these tissues over 12 and 6 day periods respectively.

No conclusive evidence was obtained to show that 2,4-D increased the oxygen consumption of the treated tissues; however, it did decrease the rate of decline with time of oxygen consumption of the embryos so that these consumed more oxygen per unit dry matter than the controls over a considerable part of the study.

The oxygen consumption of all the 2,4-D treated tissues was insensitive to 4.16 p.p.m. 2,4-dinitrophenol (DNP).

The per unit dry matter aerobic carbon dioxide evolution of all 2,4-D-treated tissues was higher than that of the corresponding controls. The respiratory quotient (R.Q.) of this tissue was in all instances approximately 1.5. That of the corresponding control tissue was lower (± 1.1), while the R.Q. of normal meristematic tissues was invariably high (± 1.5).

Relatively mature tissue (hypocotyl sections) reverting to a meristematic condition when 2,4-D was present, had a synthetic efficiency approaching that of normal meristematic tissue; embryos proliferated when 2,4-D was provided, but their synthetic efficiency was markedly lowered.

The anaerobic carbon dioxide potential of the embryos was unaffected by 2,4-D, but that of the hypocotyl sections was markedly increased. This last effect was explained by assuming that the increase was a consequence of the

tissue reverting to a meristematic condition. All the tissues studied, except the hypocotyl sections cultured in the presence of DNP showed a Pasteur effect; however, this effect did not always occur in the case of embryos provided with 2,4-D. Apparently a relatively higher concentration of ADP was sometimes present in the soluble cytoplasm of these embryos.

Several uncoupling agents including DNP, 2,4-dichlorophenol, phenosafranine, thionin, and Janus green B, differentially inhibited 2,4-D induced, abnormal growth of bean hypocotyl sections. The 2,4-D induced absormalities occurring in bean plants sprayed with 2,4-D were entirely prevented under certain conditions by spraying with DNP.

Presumably 2,4-D markedly affected the distribution of cellular metabolic energy. In hypocotyl sections the available energy was effectively channelled into growth reactions; in embryo tissue it was largely dissipated.

It was suggested that 2,4-D channels metabolic energy into abnormal growth reactions which are especially sensitive to the effects of uncoupling agents.- J.W.F.

2050. HENDERSON, J.H.M. and SPEARS, C.L. (Carver Foundation, Tuskegee Inst., Alabama, U.S.A.) The translocation of C^{14}-labeled 2,4-D in the Avena coleoptile. Plant Physiol. (Suppl.), 1960, 35, xxviii.

Studies were made, using 2 forms of carbon ^{14}-labelled 2,4-D, in the Avena coleoptile. One isotope was labelled in the (1) position in the side-chain (carboxyl-labelled); the other is labelled in the (1) position in the benzene ring. Translocation from the roots was studied after placing them in solutions of the labelled isotopes and from the tip by the use of agar blocks in a polar and non-polar direction in the coleoptiles alone. Various activities of the labelled compounds were used, ranging from 0.002 µc to 10 µc/cc and concentrations of the total 2,4-D itself varied between 5 x 10^{-2} to 5 x 10^{-6} M. All results were interpreted by autoradiographs. A standard technique was arrived at using freezing temperature, lyophylization, 15 day exposure and assaying only the coleoptiles excluding the roots. Results indicated that translocation of 2,4-D may be both polar and non-polar, although it is not quite clear what influence total concentration of 2,4-D had on these results. -- From Authors' Summary (modified). [O.W.]

2051. BLACK, C.C. and HUMPHREYS, T.E. (Univ. Florida, Gainesville, U.S.A.) The effect of 2,4-D on the enzymes of glycolysis and the pentose phosphate pathway. Plant Physiol. (Suppl.), 1960, 35, xxvii.

Previous in vivo studies had demonstrated that treatment of corn roots with 2,4-D caused an increased catabolism of glucose via the pentose phosphate pathway. This suggested that 2,4-D might inhibit or enhance a reaction or reactions of one or both of the pathways. Three-day-old etiolated corn seedlings which had been immersed for 12 hours in either 10^{-2}M phosphate buffer, pH 5.3, or in buffer + 10^{-3}M 2,4-D, were used to study the enzymes of the glycolysis and the pentose phosphate pathway. Simple extracts or acetone powder extracts were used to compare the relative activities of individual enzymes from both treated and untreated tissue. Glyceraldehyde-3-phosphate dehydrogenase activity was lower after 2,4-D treatment. The levels of the other enzymes of glycolysis were not affected. The activities of the enzymes of the pentose phosphate pathway were higher after 2,4-D treatment. - From Authors' Summary. [O.W.]

2052. BASLER, E. and NAKAZAWA, K. (Oklahoma State Univ., Stillwater, U.S.A.) Some effects of 2,4-D on the nucleic acid content of cotton leaf. Plant Physiol. (Suppl.), 1960, 35, xxvii. [O.W.]

2053. McWHORTER, C.G. and PORTER, W.K. (Delta Branch Exp. Sta., Stoneville, Mississippi, U.S.A.) Studies on the metabolism of plants treated with 3-amino-1,2,4-triazole. Physiol. Plant., 1960, 13 (3), 444-9.

Maize seedlings were grown individually in sand adjusted to a pH of 5.4, treated with amitrole 80 mg/l, and their physiological and biochemical processes studied. Respiratory assays showed that untreated tissues metabolised carbohydrates; and that treated (chlorotic) breakdown fats and/or proteins. Suggestions are made, based on data derived from experiments on the use of the respiratory inhibitors iodo-acetic acid, malonic acid, sodium fluoride, as to the probable pathway within the plant of amitrole, and the substrates metabolised and catabolised as a result of its use. - P.C. [O.W.]

2054. ROGERS, B.J. (Purdue Univ., Lafayette, Indiana, U.S.A.) The action of arsenic on germination and seedling growth. Proc. Joint Meet. 16th N. Cent. & 10th West. Canad. Weed Control Conf., 1959, 20.

The difference in mode of action between the trivalent arsenite and the pentavalent arsenate is discussed briefly. It was demonstrated by laboratory trials in which maize seed was soaked in various concentrations of sodium arsenite and arsenate for 48 hours and the subsequent root growths studied. The arsenite was about 10 times more toxic than arsenate to maize seed (var. Ind 844D). The sensitivity of maize to arsenic and arsenate varied with the genetic composition of different strains. Examples are quoted. Root growth of carbgrass [Digitaria sp.] and chewings fescue [Festuca rubra var. fallax] showed a greater response to calcium arsenate 0.5 % than red top [Agrostis sp.], perennial and annual ryegrass, or bluegrass [Poa pratensis].

In experiments with radioactive phosphate, it was shown that high arsenate concentrations (0.01 M) may reduce phosphate uptake by perennial ryegrass seeds by two thirds. Pre-soaking of seeds in an arsenate solution before germination also reduced subsequent phosphate uptake. Phosphate uptake by rye seedlings showed a similar reduction in the presence of arsenate. - D.M.L.S. [O.W.]

2055. FOY, C.L. and CASTELFRANCO, P. (Univ. Calif., Davis, Calif., U.S.A.) Distribution and metabolic fate of C^{14}-labeled 2-chloro-4,6-bis(ethylamino)-s-triazine (simazine) and four related alkylamino triazines in relation to phytotoxicity. Plant Physiol., (Suppl.), 1960, 35, xxviii.

Foliar absorption and translocation of these compounds in the symplasm of maize and soybean were negligible, regardless of solvent and the addition of a surfactant; translocation occurred readily in association with the transpiration stream. Movement of these compounds on paper using water as the only solvent (simulating conditions in the apoplast) was not correlated either directly or indirectly with water solubility. Ready breakdown of simazine-C^{14} by intact maize plants was confirmed. Coarsely chopped shoots and roots, whole plant macerates, and even particulate-free extracts of maize also caused rapid degradation of simazine-C^{14} with the evolution of only traces of $C^{14}O_2$. Approximately 2% of the applied radioactivity was tied up in plant residues after 3 hours reaction in Warburg vessels. Labelled decomposition products of simazine-C^{14} extractable in 80% ethanol appeared to be basic. Reversed phase chromatography (30% glacial acetic acid on kerosene-soaked paper) is proving satisfactory in the separation and identification of the substituted s-triazines. Preliminary observations indicated that a similar detoxification mechanism is operative against propazine-C^{14} in Sorghum vulgare L. but not in Avena. [O.W.]

2056. ASHTON, F.M. (Univ. Calif., Davis, Calif., U.S.A.) The effect of atrazine on the metabolism of C^{14} sucrose in excised bean leaves in the dark. Plant Physiol. (Suppl.), 1960, 35, xxviii.

Red kidney bean plants were grown in sand culture under continuous illumination for 10 days. The herbicide atrazine was added at a concentration of 10 p.p.m. The primary leaves were excised under water and the petioles placed in an aqueous solution of C^{14}-sucrose 10, 40 and 80 hours after the herbicide application. The leaves were allowed to take up C^{14}-sucrose for 30 minutes and then were placed in distilled water in the dark for 24 hours.

The total activity and sucrose activity of the atrazine-treated leaves was considerably less than the leaves without herbicide treatment. This indicates an increase in respiration, which is in agreement with Roth who reported an increase in respiration with simazine. The total activity of both the treated and untreated leaves decreases with time. When the results are expressed as a % of the total counts, sucrose has about one-half the activity in the treated leaf as compared to the untreated leaf, while aspartic and glutamic acids have 3.5 to 7.5 times the activity in the treated leaf when compared to the untreated leaf. - From Author's Summary. [O.W.]

2057. DUBROVIN, K.P. (Spencer Chem. Co. Kansas City, Missouri, U.S.A.) Cyto-histological responses of wheat and wild oats to carbyne [4-chloro-2-butynyl N-(3-chlorophenyl)carbamate]. Proc. Joint Meet. 16th N. Cent. & 10th West. Canad. Weed Control Conf., 1959, 15.

"Wild oats [Avena fatua] treated in the vegetative stage developed a swollen and distorted shoot apex. This usually resulted in the death of this organ and of the entire plant, particularly of those treated during the 2-leaf stage. Wheat treated during its

vegetative stage presented a moderately swollen shoot apex and the plants recovered. Both wheat and wild oats treated during their floral stages exhibited shrivelled inflorescences. The swollen condition of the shoot apex of treated wild oats seems to result from the formation of giant cells which contain many groups of chromosomes. This indicates that Carbyne derives its herbicidal action from interfering in some way with normal cell division". - Extract. [O.W.]

2058. NARAYANASWAMI, S. Influence of maleic hydrazide on plant growth. Sci. & Cult., 1960, 25,460-3, bibl.20.
The effects of MH as an inhibitor of mitosis, respiration and phloem differentiation in plants, including vegetables, fruits and ornamentals are considered. - Hort. Abstr., 1960, 30,3156.

2059. WELKER, W. and HOLM, L. (Agric.Exp. Sta.,New Brunswick,New Jersey,U.S.A.) The biological and photochemical alteration of monuron. Proc.Joint Meet.16th N.Cent. & 10th West.Canad.Weed Control Conf., 1959,17.
When C^{14} labelled monuron was mixed with moist soil and placed in a thin layer precisely at seed level, Abutilon theophrasti seedlings exhibited a high level of radioactivity at 5 days and then this declined. Abutilon seeds were then immersed in labelled monuron, removed, rinsed and sown immediately; they were then grown for several days in the light at 25°C. Assaying daily for radioactivity resulted in 130 counts/minute (CPM)/seedling at 2 days and 21 CPM at 6 days; this loss was also recorded for plants grown in the dark. In a second identical experiment the radioactive fractions were isolated and chromatographed; 3 radioactive substances were found in seedlings 48-72 hours old, while seedlings about 7 days old yielded only 2 radioactive substances. Solutions of monuron irradiated with ultra-violet light lost their herbicidal activity. - J.W.F. [O.W.]

2060. SWEETSER, P.B. and TODD, C.W. (E.I. du Pont de Nemours & Co.,Wilmington,Delaware, U.S.A.) Factors affecting the monuron inhibition of oxygen liberation in photosynthesis. Plant Physiol.(Suppl.), 1960, 35, x.
Evidence is presented that the phytotoxicity of monuron, 3-(p-chlorophenyl)-1,1-dimethylurea, to photosynthetic organisms does not result solely from the depletion of the energy of nutrient supply, but involves also the accumulation of a phytotoxic compound originating as a result of the block on the oxygen-liberating pathway. By reducing the rate of production of the oxygen intermediate through withholding CO_2, it is possible to reduce the toxicity of monuron to algae. The same components responsible for the phytotoxicity of monuron may also play a role in plant growth under conditions in which a large amount of a precursor of the oxygen evolution would be expected to accumulate. Other factors which affect monuron inhibition of photosynthesis have been found. The implications of these findings to the general scheme of photosynthesis will be presented. - Authors' Summary (modified). [O.W.]

2061. SCHRANK, A.R. (Univ.Texas,Austin 12, Texas,U.S.A.) Differential effects of 2,3,6-trichlorobenzoic acid on growth and geotropic curvature of Avena coleoptiles. Plant Physiol., (Suppl.), 1960, 35,vi. [O.W.]

2062. BOKAREV, K.S. and SATAROVA, N.A. (Timirjazev Inst.Plant Physiol.,U.S.S.R. Acad.Sci.,Moscow). [Effect of salts of thiocyanic acid and thiourea on plants.] Fiziol.Rast.(Plant Physiol.,USSR), 1957, 4,(4),361.
Potato tuber slices were treated with (a) thiourea, (b) S-methylisothiourea sulphate and (c) N-methylthiourea, to test the assumption that the capacity of thiourea to break dormancy in potato tubers is due to its isomerization to ammonium thiocyanate. The results indicated that (c) was less active than (a) in breaking dormancy and that (b) was inactive, and that (a) was not isomerized to ammonium thiocyanate. The activity of thiourea and its derivatives was considered to be due to isomerization to a form with a sulphhydryl group and that the active principle was thiocyanic acid. - P.J.B.

2063. * KATTERMAN, F.R.H. and HALL, W.C. Metabolism and mode of actions of thiophosphate cotton defoliants. Proc.Ass.Sth. agric.Wkrs, 1959, 56,125-6.

2064. ELIASSON, L. (Inst.Plant Physiol., Royal Agric.Coll.,Uppsala,Sweden). Growth response of wheat roots to anti-auxins and 2,3,5-triiodobenzoic acid (TIBA). Physiol. Plant., 1960, 13,(3), 505-9, tabs.3, bibl.21.

Wheat roots were grown in conditions optimal for natural auxin-production. In these conditions, low concentrations of TIBA did not cause growth inhibition. There was, however, a delayed effect on root elongation, which may be connected with the fact that anti-auxins decrease development of lateral roots. - P.C. [O.W.]

2065. SÜDI, J., JOSEPOVITS, G. and MATOLCSY, G. (Res.Inst.Plant Prot., Budapest, Hungary). Morphological reactions of germinating seeds as criteria for the plant growth regulating activity of auxin-type chemicals. Nature, Lond., 1960, 188, (4746), 244-5, figs.1, bibl.6.

Observations of gross abnormalities in seedlings caused by treating germinating seeds with 2,4-D were attributable mainly to inhibition of growth in length and to growth stimulation caused by abnormal cell proliferation. In experiments with cucumbers, gross visible morphological effects of unknown concentrations of 2,4-D were compared with those produced by known concentrations. The results showed that the log. concentration in the unknown 2,4-D solution was determinable within the range 0.03-1000 p.p.m. with an accuracy of ± 0.25. With other species, similar accuracy could be achieved only in a narrower range of concentrations of 2,4-D. The use of 2,4-D in the study of growth-regulating effects in plants is contrasted with the use of the normal, auxin-type tests. - P.J.B. [O.W.]

2066. WICKSON, M. and THIMANN, K.V. (Harvard Biol.Lab., Cambridge, Massachusetts, U.S.A.) The transport of IAA in pea stems in relation to apical dominance. Physiol. Plant., 1960, 13, (3), 539-54, figs.8, tabs.4, bibl.15.

The transport of radio-labelled IAA was studied in excised sections of pea stem; more was transported in sections from near the apex than from those lower down. It is concluded that IAA applied to the stem reaches the lateral buds and is itself responsible for their inhibition. Light decreased the movement of IAA. - P.C. [O.W.]

2067. MINARDI, G. and BONOLA, P. (Univ.Milano, Italy). Sul variare dell' attivita auxinica negli acidi indol-3-acetico, 4,5-benzoindol-3-acetico e 4,5-naftoindol-3-acetico. [On the variation of auxinic activity with indole-3-acetic, 4,5-benzoindole-3-acetic and 4,5-naphthoindole-3-acetic acids.] Rev.Espan.Fisiol., 1959, 15, (3), 179-88.

The enlargement of the ring depresses total growth activity, limiting secondary activity in 4,5-benzoindole-3-acetic acid and leading to inactivity in 4,5-naphthoindole-3-acetic acid. - Biol.Abstr.(Plant Sci.), 35,42473.

2068. SARGENT, J.A. and WANGERMAN, E. (Dep. Agric., Oxford Univ., England). The effect of some growth regulators on the vascular system of lemna minor. New Phytol., 1959, 58,345-63, figs.10, tabs.4, bibl.27.

The method of action of TIBA and IAA on the vascular system and the nature of growth regulation as an herbicidal factor were studied. Solutions of 10-15 mg/l promote auxin formation, with consequent proliferation of the vascular system. A number of other compounds were treated by means of the vein index; of 12 halogen-substituted benzoic acids tried, the most effective were found to be 2,5-dichloro-, 2-chloro-5-bromo- and 2,5-dibromobenzoic acids. - P.C. [403(42)]

2069. MAINI, N.S. and SANDHU, S.S. (Reg. Res.Cent.Oilseeds, I.C.A.R., Patiala, India). Effect of some growth substances on seed set in Eruca sativa. Sci. & Cult., 1959, 25, (6), 377-8.

α-Naphthylacetamide (AAm) in 10 p.p.m. concentration showed favourable influence on the number of pod set and number of seeds formed/pod. 2,4,5-trichlorophenoxypropionic acid (2,4,5-TP) and MH were toxic. - Biol. Abstr., (Plant Sci.), 35,42471.

2070. RIGBY, J.F. Light as a control in the germination and development of several mistletoe species. Proc.Linn.Soc.N.S.W. 1959, 1960, 84, (3), 335-7.

It is shown that daylight is necessary at some stage in the germination and early development of some mistletoes. When, in the ripe fruit, the embryo is white, no germination can occur unless sunlight falls on the seed after the removal of the pericarp. If the embryo is green, germination can occur in the dark, but continued growth will stop unless the surface of the endosperm is coloured. When the surface of the endosperm is coloured, growth will continue in the dark, but no clamp will form unless light is permitted to fall on the seedling. The orientation of the seed has no effect on its ability to germinate. - Biol.Abstr., (Plant Sci.), 35,48768.

2071. CRAFTS, A.S. (Univ.Calif.,Davis, Calif.,U.S.A.) Relative mobility and redistribution of labeled tracers in plants. Plant Physiol.(Suppl.), 1960, 35,iii.
Continuing studies on relative mobility of labelled tracers show wide differences in the distribution of different substances. Whereas the extent of distribution of a tracer of low or intermediate mobility (i.e. 2,4-D or IAA) may depend on the growth activity of the plant, among freely mobile compounds different molecules attain entirely different distributions. For example, MH is freely mobile and attains thorough distribution in tops and roots from foliar application but dalapon attains only a very low concentration in roots. Monuron, simazine and calcium enter roots and move freely in the transpiration stream but will not move appreciably from foliar application. The compound 2,3,6-trichlorobenzoic acid seems to be very freely mobile from either root or leaf application and in either case it tends to accumulate in the young shoot tip of bean where very severe distortion of tissue and inhibition of growth occur. This compound stimulates respiration in young tissues and it is proposed that this stimulation creates an active sink for food transport and hence tends to direct the movement of the toxic compound into the shoot tip. Such distribution following root application must involve primary distribution via the transpiration stream followed by secondary movement in the phloem. In corn this ompound was translocated slowly from the treated leaf and it was localized in the more mature parts of the other mature leaves; the same distribution resulted from root application. It is proposed that these differences in distribution may account in part for the selectivity of 2,3,6-TBA. - Author's Abstract. [O.W.]

2072. BYRDY, S., PECZAK, J. and SZYMURA, W. [A rapid method for the determination of the biological activity of plant growth substances.] Przemysl Chem., 1959, 38,378-81.
The proportion of seeds of Sinapis alba not germinating in 24 hours were determined at at least 5 concentrations. From the results the concentration causing 50% inhibition in germination (DL 50) can be calculated and compared with the controls. The DL 50 for 2,4-D in soft water was 191 and in hard water 234 mg/l. - Chem.Zbl., 131,10279.

PATENTS

2073. TURSICH, J.A. Herbicide and fungicide. French Patent, 1957, 1 149 233.

2074. GREAT BRITAIN. A. Trichlorobenzoic acid. B. Herbicidal mixtures. British Patent, 1955, 817 173.
A. A mixture of trichlorobenzoic acids is prepared (50-75% of 2,3,6-isomer and 2,4,5-isomer) by converting a crude 2,3,6-trichlorobenzyl halide (obtained by chlorination of a chlorotoluene) into a trichlorobenzyl ether which is then oxidised, e.g. with HNO3. The product is useful as a herbicide. B. The mixture contains not more than 75% of the 2,3,6-isomer. - J.Sci. Fd Agric., 1960, 11,(10),ii-161.

2075. SCHWARTZ, H. [The production of 4-substituted 1-halogenacetoxybutenes.] French Patent, 1955, 1 171 995.
To Vineland Chem.Co. et al. - From Chem. Zbl., 131,4649.

2076. BARNSLEY, G.E., EATON, J.K. and AIRS, R.S. Substance for controlling plant growth. Australian Patent, 1958, 215 097.

2077. GERJOVICH, H.J. and RAYNER, S.J. Mittel zur Vernichtung von Unkraut. [Weedkiller.] Swiss Patent, 1959, 337 681.
Synthesis. Carbamylides. Especially for selective weed control in cereals. To E.I. du Pont de Nemours & Co. - From Chem. Zbl., 131,3010.

2078. GYSIN, H. and KNUSLI, E. Unkrautbekämpfungsmittel. [Weedkiller.] Swiss Patents, 1959, 338 324, 338 642/6.
Triazines. To J.R. Geigy A.G. - From Chem.Zbl., 131,4648.

2079. GREAT BRITAIN. Control of undesired vegetation. British Patent, 1957, 815 210.
The composition comprises inert finely divided solid, wetting, emulsifying or surface-active agent, fertiliser and (as active ingredient) not less than 0.001 wt % of a cyclohexane derivative substituted in the 1-position by C:X and by OY (X is H or Me; Y is H, Ac or COEt) and optionally in the 2-, 3- or 4-position by Me, e.g. 1-

ethynylcyclohexanol. Inert solid carrier is specifically diatomaceous earth, pyrophyllite, gypsum, Kaolinite or neutral or acidic volcanic ash. To Dow Chem.Co. J.Sci.Fd Agric., 1960, 11,(10),ii-162.

2080. RIGTERINK, R.H. 3,4-dihydro-1,3-benzoxazines. British Patent, 1957, 814 272.
Compounds useful as bactericides, fungicides and herbicides, comprise 3,4-dihydro-1,3-benzoxazines substituted in the 3-position by cyclohexyl, benzyl, monochlorophenyl or dichlorophenyl and in the benzene nucleus by 1-2 Cl. As an example of preparation, a mixture of paraformaldehyde KOH and MeOH is heated until homogeneous then the solution is cooled and m-chloroaniline followed by p-chlorophenol is added and the whole heated for 1 hour at 83-85° to give 6-chloro-3-(m-chlorophenyl)-3,4-dihydro-benzoxazine, m.p. 103-104.5°. To Dow Chem.Co. - J.Sci.Fd Agric., 1960, 11,(10), ii-162.

2081. KAESS, F., KRONACHER, H., HOGER, H. and DICHTL, W. Herstellung von weissem Kalkstickstoff. [The production of white calcium cyanamide.] German Patent, 1956, 972 551.
Synthesis. To Süddeutsche Kalkstickstoffwerke A.G. - From Chem.Zbl., 131,3355.

2082. BAUMANN, J. and HARTEL, K. Selektive Unkrautvernichtung in Kulturen von Gladiolen, Schwertlilien und Beerenobst. [Selective weed control in gladioli, iris and small fruits.] Swiss Patents, 1955, 325 360/1.

2083. ITALY. Granulation process. Italian Patent, 1955, 497 818.

2084. KOHN, G.K. Stabilising organic compounds containing chlorine. French Patent, 1958, 1 151 246.

2085. GREAT BRITAIN. Devices for weeding plant rows or for thinning out beets. British Patent, 1960, 835 654.
To C. van der Lely, N.V. (Netherlands).
[N.I.A.E.]

MISCELLANEOUS

2086. KURTH, H. Chemische Unkrautbekämpfung. [Chemical weed control.] Veb Gustav Fischer Verlag, Jena, 1960, pp.229.
This book is primarily a practical guide to the biology of weeds and to the characteristics and uses of herbicides for their control. It is divided into 6 main sections. Section 1 is a general introduction to the subject. Section 2 reviews the biology of weeds and includes tables giving seed production data for an extensive list of weeds and the % germination of the seed of a range of weeds held for different periods of time at temperatures of 15-20°C and in light. Section 3 surveys the mode of action of herbicides. Section 4 reviews briefly the chemistry and herbicidal action of the more important selective and non-selective herbicides. Section 5 reviews use of herbicides for weed control in different crops and gives brief details of the characteristics of nearly 200 weed species and methods for controlling them. Section 6 is devoted to a discussion of spray machinery and techniques for applying herbicides. An extensive appendix contains, among other things, talks giving (a) the reaction of 103 weeds of arable crops to MCPA, 2,4-D (amine and ester), 2,4,5-T, MCPB, 2,4-DB, mecoprop, 2,3,6-TBA, DNOC and dinoseb, (b) the reaction of 103 weeds of grassland to MCPA, 2,4-D, 2,4,5-T, MCPB, 2,4-DB and mecoprop, (c) the reaction of 40 woody species to overall, basal and stump treatment with 2,4-D or 2,4,5-T, (d) the sensitivity of 30 grass species to dalapon. - P.J.B.

2087. KURTH, H. (Blösein,Germany). Herbicide-eine Übersicht über die Entwicklung in den letzten 5 Jahren. [Herbicides, a review of developments in the last 5 years.] Dtsch.Akad.Landw.Berlin, 1959, (21),19-30, bibl.29.
The world-wide increase in the use of chemical herbicides is indicated. Only empirical methods of testing are considered of use. A list of herbicides introduced in the last 5 years is appended. - P.C.
[242(43)]

2088. LOBAY, W. and GOETTEL, A.W. (Alberta Dep.Agric.,Edmonton,Canada). Weed control with chemicals. Publ.Dep.Agric.Alberta, 1960, (83),pp.22.

Recommendations are given for weed control in cereal, grass, legume and horticultural crops in Alberta and for the use of spray machinery. - P.J.B. [238(71)]

2089. LAGUINGUE, E.M. and DELLE COSTE, A.C. Uso actual de los herbicidas selectivos derivados del 2,4-D y del MCP. [Current use of selective herbicides derived from 2,4-D and MCPA.] Rep.Est.exp.agropec. Pergamino, 1959, 68-70, (Span.), figs.1, tabs.1.
The regions in which herbicides are used most are (1) in the north of Buenos Aires and the south of Santa Fe, and (2) in the south-east of Buenos Aires. In region (1), which is mainly maize, 2,4-D is most used and its use there accounts for 70-80% of the country's total consumption. In region (2) which is mainly cereals and pasture, MCPA is used more and its use there accounts for 60% of total consumption. A list of 48 weeds is included indicating their presence or absence in these 2 regions. - D.M.L.S. [G.R.I.]

2090. DELLE COSTE, A. (Tec.de Duperial, Compania Quimica,Argentina). Antecedentes sobre el uso de herbicidas quimicos en el pais. [History of the use of chemical herbicides in the country.] Rep.Est.exp.agropec. Pergamino, 1959, 63-6.
Includes figures for the sale and consumption in Argentina of various herbicides during the period 1939-56. - D.M.L.S. [G.R.I.]

2091. MARSICO, O.J.V. (Direccion de Sanidad Vegetal,Buenos Aires,Argentina). Zonas de mayor aplicacion de herbicidas selectivos. [Zones with the greatest use of selective herbicides.] Rep.Est.exp.agropec.Pergamino, 1959, 66-8, (Span.), figs.1,tabs.1.
The 2 zones in Argentina in which herbicides are most used are shown on a map and an estimate is given of the areas sprayed with 2,4-D and MCPA in various departments of Buenos Aires, Santa Fe, Cordoba and Entre Rios provinces during 1954/55. - D.M.L.S. [G.R.I.]

2092. BECK, T.V. (Dep.Agric.,Saskatchewan, Canada). Persistent perennial weed control in Saskatchewan. Proc.16th N.Cent. & 10th West.Canad.Weed Control Conf., 1959, 22-3.
A short account of governmental enterprise for the control of perennial weeds particularly toadflax [Linaria vulgaris] in Saskatchewan. - D.M.L.S. [O.W.]

2093. LORAY, W. (Alberta Dep.Agric., Edmonton,Canada). Provincial weed laws and enforcement in Alberta. Proc.Joint Meet.16th N.Cent. & 10th West.Canad.Weed Control Conf., 1959, 29.
Includes an account of the organization of the Agricultural Service Boards. - D.M.L.S. [O.W.]

2094. FORBES, J.O. (Saskatchewan Dep. Agric.,Regina,Canada). The Noxious Weeds Act for the Province of Manitoba. Proc. Joint Meet.16th N.Cent. & 10th West.Canad. Weed Control Conf., 1959, 29-30. [O.W.]

2095. BECK, T.V. (Saskatchewan Dep.Agric., Regina,Canada). The Saskatchewan Noxious Weeds Act. Proc.Joint Meet.16th N.Cent. & 10th West.Canad.Weed Control Conf., 1959, 30. [O.W.]

2096. TEEL, W.C. (Noxious Weed Div.,State Off.Bldg,Topeka,Kansas,U.S.A.) The Kansas Noxious Weed Law. Proc.Joint Meet.16th N. Cent. & 10th West.Canad.Weed Control Conf., 1959, 31. [O.W.]

2097. BJERKEN, S. (Univ.Minnesota,St.Paul, U.S.A.) The Minnesota Weed Law. Proc. Joint Meet.16th N.Cent. & 10th West.Canad.Weed Control Conf., 1959, 31-2. [O.W.]

2098. KREINER, L.W. (Nebraska State Dep. Agric.,State Capitol,Lincoln,U.S.A.) The Nebraska weed control program. Proc.Joint Meet.16th N.Cent. & 10th West.Canad.Weed Control Conf., 1959, 32-3. [O.W.]

2099. RICHARDS, H.T. (Wisconsin Dep.Agric., Agronomy Bldg,Madison 6,U.S.A.) Noxious weed law enforcement in Wisconsin. Proc. Joint Meet.16th N.Cent. & 10th West.Canad. Weed Control Conf., 1959, 33-4. [O.W.]

2100. McCOY, W.J. (Dow Chem.Co.,1750 Hennepin Ave,Minneapolis,Minnesota,U.S.A.) Panel discussion: Dealer education - how best accomplished. An industry viewpoint. Proc.Joint Meet.16th N.Cent. & 10th West. Canad.Weed Control Conf., 1959, 27-8. [O.W.]

2101. LOBAY, W. (Dow Chem.Co., 1750 Hennepin Ave,Minneapolis,Minnesota,U.S.A.) Panel discussion: Dealer education - how best accomplished. A regulatory viewpoint. Proc.Joint Meet.16th N.Cent. & 10th West. Canad.Weed Control Conf., 1959, 27-8. [O.W.]

2102. TURNER, M.B. (Amchem Products Inc.,Ambler,Pennsylvania,U.S.A.) How can extension and regulatory agencies work better with industry to help the farmer? Proc.Joint Meet.16th N.Cent. & 10th West. Canad.Weed Control Conf., 1959, 25-6. [O.W.]

2103. WALLACE, K. (S.Dakota State Coll. Brookings,S.Dakota,U.S.A.) The role of extension service. Proc.Joint 16th N.Cent. & 10th West.Canad.Weed Control Conf., 1959, 28-9. [O.W.]

2104. SYLVESTER, E.P. Selling weed control to the farmer. Proc.Joint Meet. 16th N.Cent. & 10th West.Canad.Weed Control Conf., 1959, 3-5.
Advice on how to do so. - D.M.L.S.
[O.W.]

List of Common Names and Chemical Abbreviations

Revised August, 1960.

The following list, based on that adopted by the Weed Society of America has been approved by the British Weed Control Council, except those marked □.
An asterisk (*) signifies common names approved by the B.S.I.
A plus sign (+) signifies approval by the Weed Society of America.

amiben □+	3-amino-2,5-dichlorobenzoic acid
amitrole □+	3-amino-1,2,4-triazole
AMS □+	ammonium sulphamate
atrazine □+	2-chloro-4-isopropylamino-6-ethylamino-1,3,5-triazine
barbane □	4-chloro-2-butynyl-N-(3-chlorophenyl)carbamate
CDAA +	2-chloro-NN-diallylacetamide
CDEA +	2-chloro-NN-diethylacetamide
CDEC +	2-chloroallyl-NN-diethyldithiocarbamate
chlorpropham *	isopropyl-N-(3-chlorophenyl)carbamate
4-CPA +	4-chlorophenoxyacetic acid
4-CPB	4-(4-chlorophenoxy)butyric acid
2,4-D +*	2,4-dichlorophenoxyacetic acid
3,4-DA +	3,4-dichlorophenoxyacetic acid
dalapon +*	2,2-dichloropropionic acid
2,4-DB *	4-(2,4-dichlorophenoxy)butyric acid
DCU +□	dichloralurea
2,4-DEB +	2,4-dichlorophenoxyethyl benzoate
2,4-DES *	2,4-dichlorophenoxyethyl hydrogen sulphate
dichlone +*	2,3-dichloro-1,4-naphthaquinone
dinosam *	2-s-amyl-4,6-dinitrophenol
dinoseb *	2-s-butyl-4,6-dinitrophenol
diquat +*	1,1'-ethylene-2,2'-dipyridylium dibromide
diuron +	N-(3,4-dichlorophenyl)-N'N'-dimethylurea
DMTT + □	3,5-dimethyltetrahydro-1,3,5,2H-thiadiazine-2-thione
DNOC *	2-methyl-4,6-dinitrophenol or 3,5-dinitro-o-cresol
2,4-DP	2-(2,4-dichlorophenoxy)propionic acid
endothal +	3,6-endoxohexahydrophthalic acid
EPTC +□	ethyl-NN-dipropylthiolcarbamate
erbon +	2-(2,4,5-trichlorophenoxy)ethyl-2',2'-dichloropropionate
fenac □+	2,3,6-trichlorophenylacetic acid
fenuron +	N-(phenyl)-N'N'-dimethylurea
ipazine □+	2-chloro-4-diethylamino-6-isopropylamino-1,3,5-triazine
MCPA +*	4-chloro-2-methylphenoxyacetic acid
MCPB *	4-(4-chloro-2-methylphenoxy)butyric acid
MCPES +	sodium 4-chloro-2-methylphenoxyethyl sulphate
mecoprop *	dl-2-(4-chloro-2-methylphenoxy)propionic acid
MH +□	maleic hydrazide
monuron +*	N-(4-chlorophenyl)-N'N'-dimethylurea
neburon +	N-(3,4-dichlorophenyl)-N'-butyl-N'-methylurea
NPA +	N-1-naphthylphthalamic acid
PCP +	pentachlorophenol
PMA +	phenyl mercuric acetate
propazine +□	2-chloro-4,6-bis(isopropylamino)-1,3,5-triazine
propham *	isopropyl-N-phenylcarbamate
simazine +	2-chloro-4,6-bis(ethylamino)-1,3,5-triazine
SMDC +□	sodium methyl dithiocarbamate
2,4,5-T +*	2,4,5-trichlorophenoxyacetic acid
2,4,5-TB	4-(2,4,5-trichlorophenoxy)butyric acid
2,3,6-TBA +	2,3,6-trichlorobenzoic acid
TCA +	trichloroacetic acid
2,4,5-TES +	sodium 2,4,5-trichlorophenoxyethyl sulphate
2,4,5-TP	2-(2,4,5-trichlorophenoxy)propionic acid
trietazine +□	2-chloro-4-diethylamino-6-ethylamino-1,3,5-triazine
3Y9 □	tris-(2,4-dichlorophenoxyethyl)phosphite

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